NLM® Training: PubMed®

MEDLARS Management Section
U.S. National Library of Medicine®
National Institutes of Health
Department of Health and Human Services
Bethesda, Maryland

October 2009 Revision

NOTES

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NLM Training: PubMed

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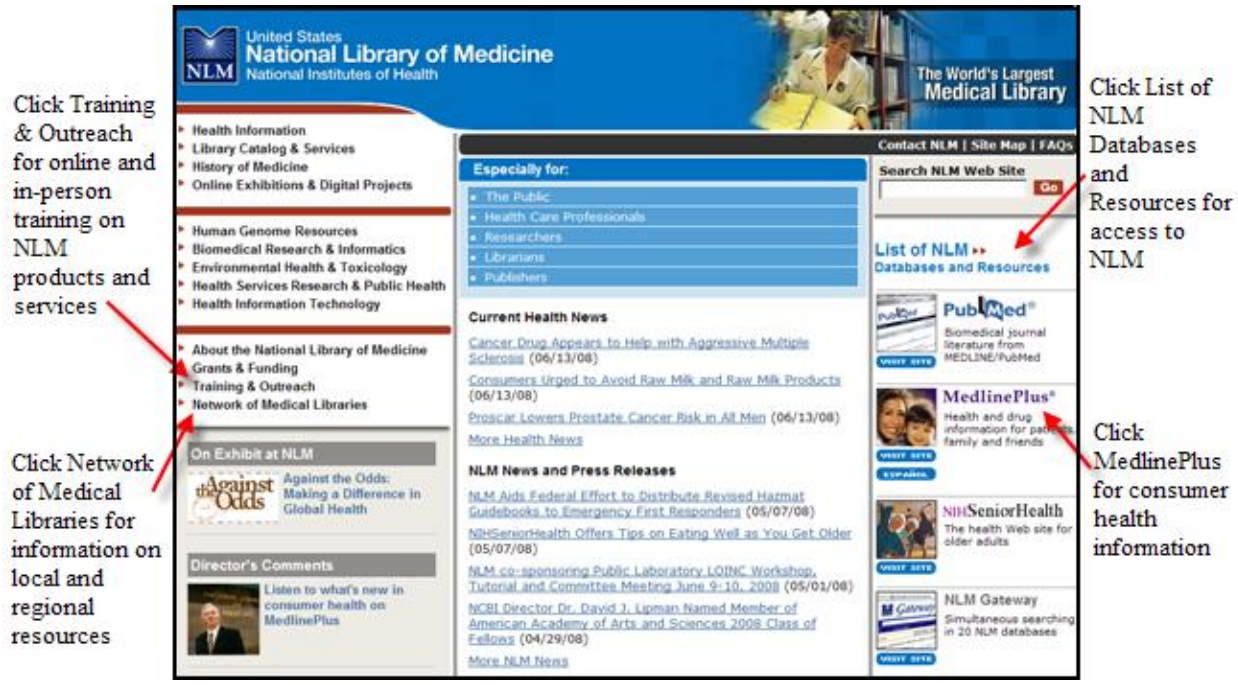
Goals and Objectives

By the end of this course, you should be able to:

- Understand PubMed's scope and content.
- Understand how the MeSH vocabulary is used to describe and retrieve citations.
- Build a search using MeSH and PubMed search tools (Details, Limits, History, etc.)
- Manage your results using display, sort, the Clipboard, save, print, e-mail and order features.
- Save your search strategies.
- Link to full-text articles and other resources.
- Use filters and special queries, and other PubMed/NCBI tools.

Introduction to the U.S. National Library of Medicine

The United States National Library of Medicine (NLM), part of the National Institutes of Health (NIH), is the world's largest medical library. The collections of the National Library of Medicine include more than seven million books, journals, technical reports, manuscripts, microfilms, photographs, and images on medicine and related sciences, including some of the world's oldest and rarest works.



The National Network of Libraries of Medicine®

Medical libraries throughout the United States are joined together in a network. The purpose of the National Network of Libraries of Medicine (NN/LM®) is to provide health science practitioners, investigators, educators, and administrators in the United States with timely, convenient access to biomedical and health care information resources.

- The network is administered by the National Library of Medicine.
- It consists of eight Regional Medical Libraries (major institutions under contract to NLM), more than 159 Resource Libraries (primarily at medical schools), and some 4,762 Primary Access Libraries (primarily at hospitals).
- The Regional Medical Libraries administer and coordinate services in the network's eight geographical regions.

Take Note:

NN/LM Web site: **http://nnlm.gov**

Toll free phone number: 1-800-338-7657

Document Delivery

- **Loansome Doc®** offers full-text document ordering. This feature is part of PubMed and the NLM Gateway.
- **DOCLINE®** is the computerized interlibrary loan system that is the foundation for Loansome Doc.

More information on Loansome Doc and DOCLINE may be found on factsheets found at the NLM Web site:

Loansome Doc – http://www.nlm.nih.gov/pubs/factsheets/loansome_doc.html

DOCLINE - http://www.nlm.nih.gov/pubs/factsheets/docline.html

NLM Technical Bulletin

- A bi-monthly newsletter published for NLM online searchers.
- The *NLM Technical Bulletin* keeps searchers apprised of:
  - changes and enhancements to NLM retrieval systems
  - changes to MeSH vocabulary
  - tips for searching
- The *Technical Bulletin* is published electronically on the NLM Web site. The URL is:

http://www.nlm.nih.gov/pubs/techbull/tb.html

Sign up for an **RSS** feed to be notified each time an article is published. Alternatively, click on **E-mail Sign up** to subscribe to the NLM mailing list to receive a weekly e-mail listing newly added items to the NLM web site. See details on Page 9.

Consumer Information

- On October 22, 1998 NLM launched a consumer health Web page called **MedlinePlus**® (medlineplus.gov)
- Designed to direct consumers to resources containing information that will assist in researching their health questions.
- The pages are designed for educational use only and are not intended to replace advice from a health professional.
- These pages provide a carefully selected list of resources, not a comprehensive catalog.

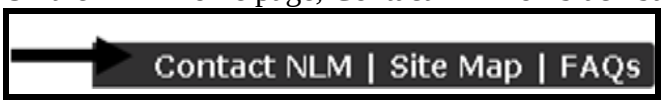
Click on the **MedlinePlus** image on the right-hand side of the NLM home page:

NLM Customer Service

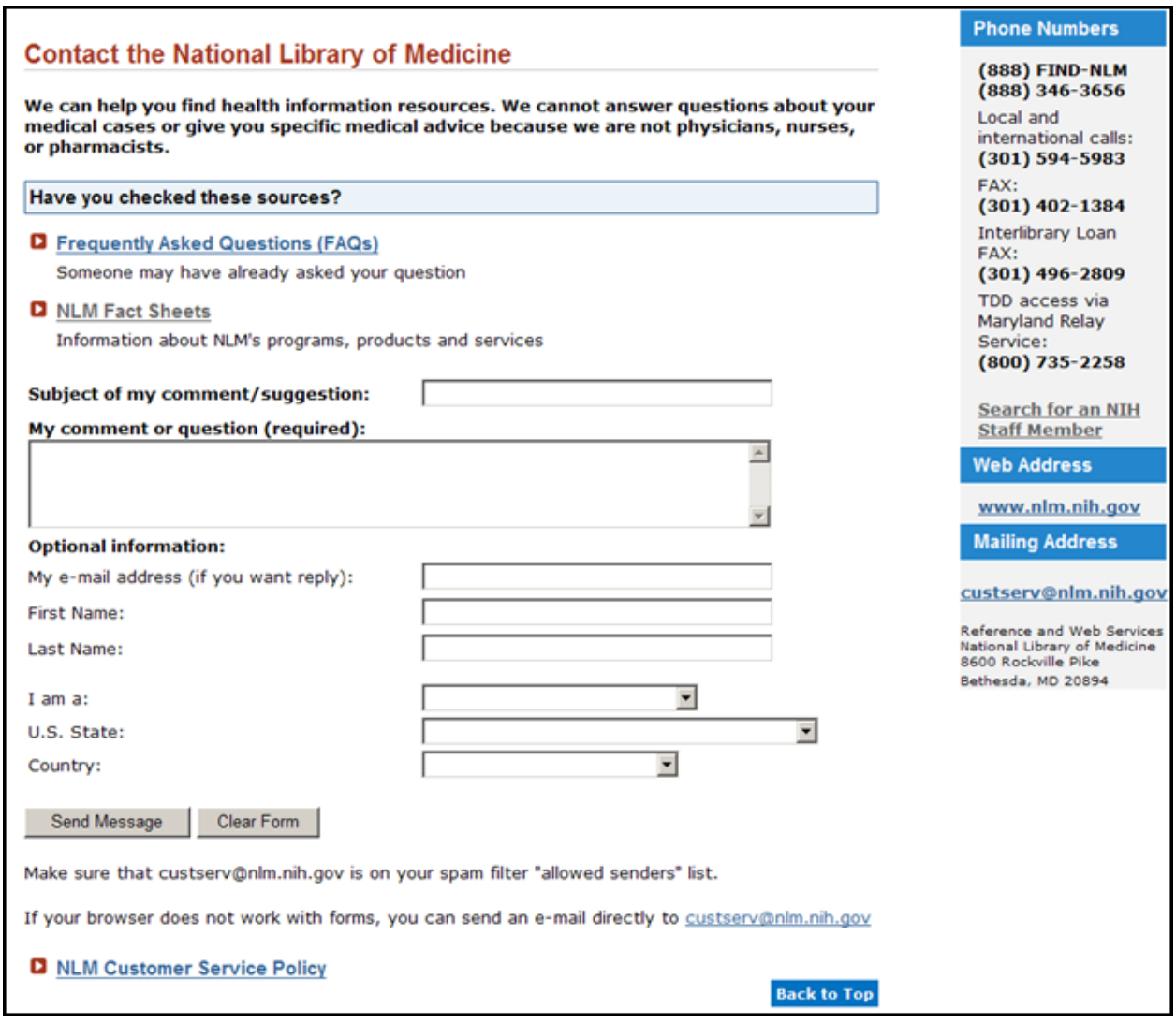
Contact NLM if you need assistance or have questions about NLM's products or services.

E-mail	**custserv@nlm.nih.gov**
Toll-Free Phone	**1-888-FINDNLM (1-888-346-3656)**

On the NLM home page, Contact NLM on black bar:



You will be taken to this screen:



For assistance with PubMed, you may also use the Write to the Help Desk link at the bottom of any PubMed screen.

Subscribe to NLM-Announces Mailing List

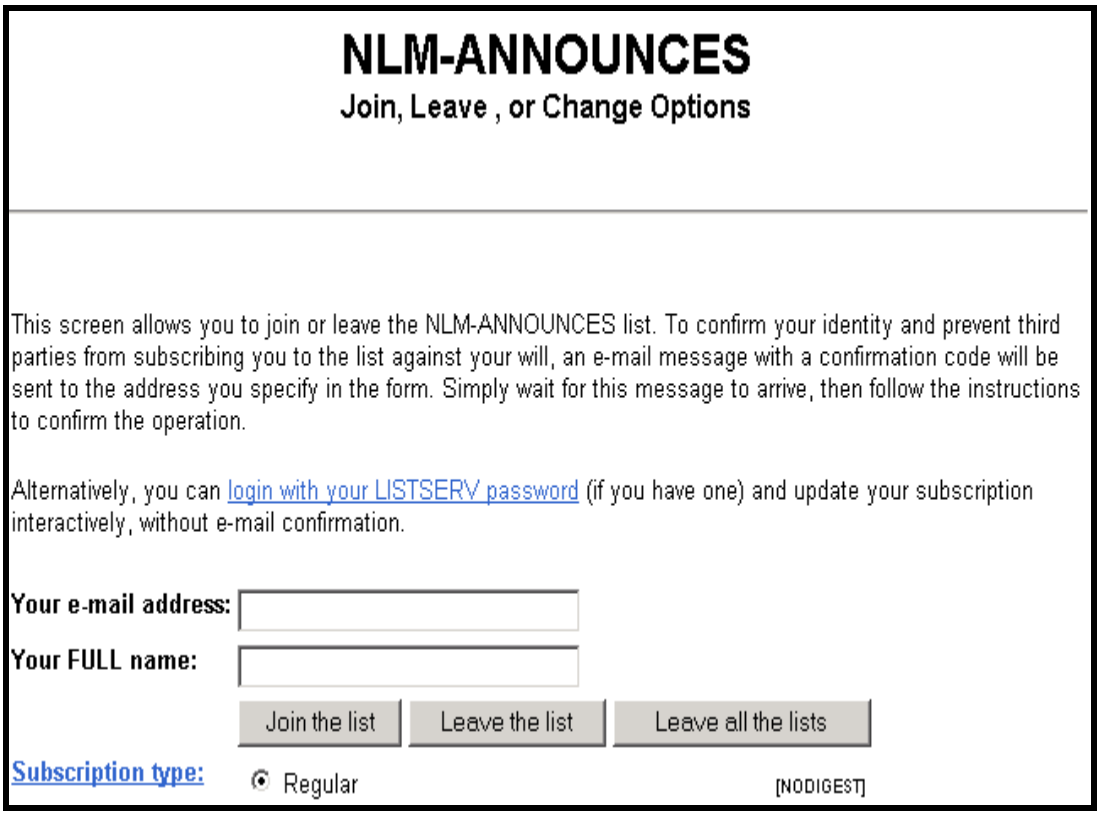
This mailing list will alert you when new information has been added to the NLM Web site. For example:

- When articles have been added to the *NLM Technical Bulletin* Web site
- When the training manuals have been revised
- Other important NLM announcements and events

Go to **https://list.nih.gov/archives/nlm-announces.html**
Click on Join or leave the list (or change settings)

or

Click on **About the National Library of Medicine** from the NLM home page.
Click on **News and Events**.
Scroll down to **New on this Site**. Click on **Subscribe to the NLM-Announces mailing list.**
Click on **NLM-Announces.**
Click on **Join or leave the list (or change settings).**



Fill in this information.

Click Join the list button.

NOTES

Introduction to PubMed® (pubmed.gov)

- NLM has been indexing the biomedical literature since 1879, to help provide health professionals access to information necessary for research, health care, and education.
- What was once a printed index to articles, the *Index Medicus*, became a database now known as MEDLINE®. MEDLINE contains journal citations and abstracts for biomedical literature from around the world.
- Since 1996, free access to MEDLINE has been available to the public online via PubMed

Click here.

Figure 1: NLM Home Page http://www.nlm.nih.gov

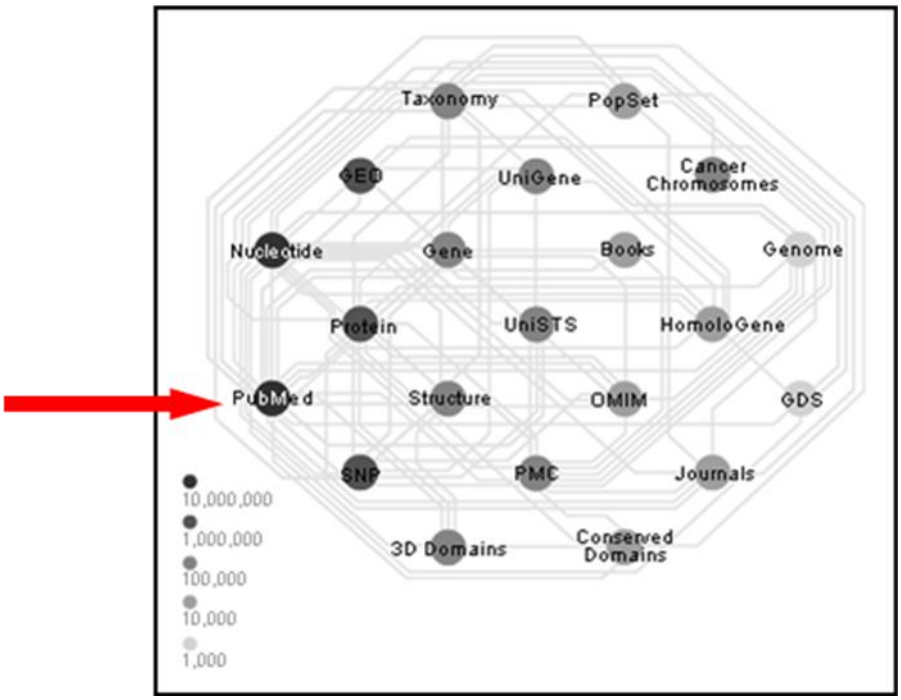
- PubMed is a database developed by the National Center for Biotechnology Information (NCBI) at the National Library of Medicine (NLM) available on the Web.
- PubMed is one of several databases under NCBI's Entrez retrieval system.
- PubMed currently includes over 19 million bibliographic citations.
- PubMed also has links to the full-text of articles at participating publishers' Web sites, as well as biological data, sequence data, and more from other Entrez Databases and from third parties.

Interrelationships between Entrez Databases

- PubMed provides links to the integrated molecular biology databases maintained by NCBI. These databases contain: DNA and protein sequences, genome mapping data, and 3-D protein structures, aligned sequences from populations, and the Online Mendelian Inheritance in Man (OMIM). Links between MEDLINE records and sequence records make it easy to find MEDLINE abstracts associated with sequence records and vice versa.

- PubMed also provides links to chemical information in PubChem Substance, PubChem Compound and PubChem Bioassay databases.

- The following diagram illustrates the relationships between some of the information resources in Entrez:



See an interactive view of Entrez links at http://www.ncbi.nlm.nih.gov/Database/

What's in PubMed

- Most PubMed records are MEDLINE citations.
- Other records include those in different stages of processing (including records provided directly from the journal publisher) but destined to be MEDLINE citations.
- A relatively small number of records that are included in PubMed but not selected for MEDLINE.

MEDLINE Citations

PubMed provides access to **MEDLINE**, the National Library of Medicine's premier bibliographic database containing citations and author abstracts from approximately 5,200 biomedical journals published in the United States and in other countries.

The scope of MEDLINE includes such diverse topics as microbiology, delivery of health care, nutrition, pharmacology and environmental health. The categories covered in MEDLINE include everything from anatomy, organisms, diseases, psychiatry, and psychology to the physical sciences.

- MEDLINE currently contains over 17 million references dating back to 1948.
- New material is added Tuesday through Saturday.
- Coverage is worldwide, but most records (about 90%) are from English-language sources or have English abstracts.
- Approximately 79% of the citations are included with the published abstract.

MEDLINE Journal Selection

- The Literature Selection Technical Review Committee (LSTRC) meets three times a year and considers approximately 140 titles for MEDLINE at each meeting.
- Final approval is made by the Director of the National Library of Medicine.
- Titles are considered for scope and coverage, quality of content, quality of editorial work, production quality, audience, and type of content.
- For more details, see the NLM Fact Sheet, MEDLINE Journal Selection, at http://www.nlm.nih.gov/pubs/factsheets/jsel.html.

MEDLINE® – Basic Bibliographic Citation

One MEDLINE citation represents one journal article and is composed of fields that provide specific information (Title, Author, Language, etc.) about the journal article. The following information is generally provided:

- Title of the journal article
- Names of the Authors
- Abstract published with the article
- Controlled Vocabulary search terms (Medical Subject Headings)
- Journal Source Information
- First Author Affiliation
- Language in which the article was published
- Publication Type (description of the type of article, e.g., Review, Letter, etc.)

A sample MEDLINE citation from PubMed follows.

PubMed MEDLINE citation

Curr Top Dev Biol. 2006;76:103-27.

Wnt signaling: a key regulator of bone mass.

Baron R, Rawadi G, Roman-Roman S.

Yale University School of Medicine New Haven, Connecticut 06520, USA.

The identification of a link between bone mass in humans and gain- [high bone mass (HBM) trait] or loss-of-function [osteoporosis pseudoglioma (OPPG) syndrome] mutations in the Wnt coreceptor lipoprotein receptor-related protein (LRP)5 or in the Wnt antagonist sclerostin (sclerosteosis, Van Buchem syndrome) has called the attention of academic and industry scientists and clinicians to the importance of this signaling pathway in skeletal biology and disease. Multiple genetic and pharmacological manipulations of Wnt signaling in mice have since then confirmed the central role of this pathway in both the establishment of peak bone mass and its maintenance throughout life. Wnt signaling appears to be located downstream of bone morphogenetic proteins (BMPs), itself induced by Hedgehog (Hh) signaling, suggesting that it is the successive recruitment of these three intracellular signaling cascades that allow the full expression of the genetic patterns that characterize the osteoblast, the cell responsible for the formation of bone.

PMID: 17118265 [PubMed - indexed for MEDLINE]

⊖ Publication Types, MeSH Terms, Substances

Publication Types:

Review

MeSH Terms:

Animals
Bone Density
Bone Remodeling
Bone and Bones/anatomy & histology*
Bone and Bones/drug effects
Bone and Bones/metabolism*
Humans
LDL-Receptor Related Proteins/chemistry
LDL-Receptor Related Proteins/genetics
LDL-Receptor Related Proteins/metabolism
Mice
Models, Biological
Mutation
Osteoblasts/metabolism
Osteogenesis
Signal Transduction/drug effects
Wnt Proteins/antagonists & inhibitors
Wnt Proteins/genetics
Wnt Proteins/metabolism*
beta Catenin/metabolism

Substances:

LDL-Receptor Related Proteins
LRP6 protein, human
Wnt Proteins
beta Catenin
lipoprotein receptor related protein 5

How Citations Get Into PubMed

- Records are either supplied electronically by publishers or created using scanning and Optical Character Recognition (OCR) at NLM.
- Citations are immediately made available via PubMed. All citations go through a quality control process, and citations from MEDLINE journals are indexed.
- All citations display a status tag, which indicates their stage of processing. See the Summary table on page 21.

Publisher Supplied Citations

- These are citations that are supplied electronically by publishers directly to PubMed. The citations are then forwarded to NLM's Index Section to be processed. (Not all citations are supplied electronically).

- Citations received electronically have the status tag: **[PubMed - as supplied by publisher]**.

Sample PubMed citation that was submitted electronically but processing has not yet begun:


A powder formulation of measles vaccine for aerosol delivery.
LiCalsi C, Maniaci MJ, Christensen T, Phillips E, Ward GH, Witham C.
Vaccine. 2001 Mar 21;19(17-19):2629-36.
PMID: 11257402 [PubMed - as supplied by publisher]
Related articles

*Notice the **[PubMed – as supplied by publisher]** status tag.*

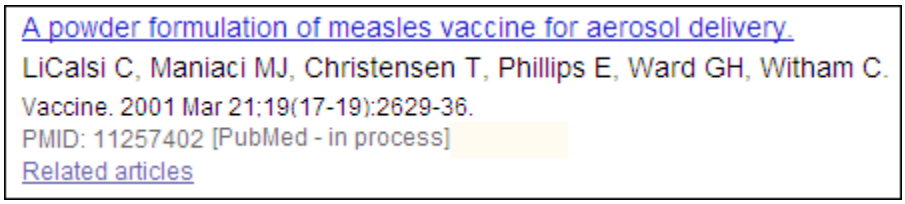
In Process

- These citations are being reviewed for inclusion in MEDLINE and, if in scope, subsequently are indexed with MeSH® vocabulary. In addition the bibliographic data in these records is being checked for accuracy.

- In process records carry the status tag: **[PubMed – in process].**

- In process records are added to PubMed Tuesday-Saturday.

Sample In Process citation in PubMed:


A powder formulation of measles vaccine for aerosol delivery.
LiCalsi C, Maniaci MJ, Christensen T, Phillips E, Ward GH, Witham C.
Vaccine. 2001 Mar 21;19(17-19):2629-36.
PMID: 11257402 [PubMed - in process]
Related articles

*Notice the **[PubMed – in process]** status tag.*

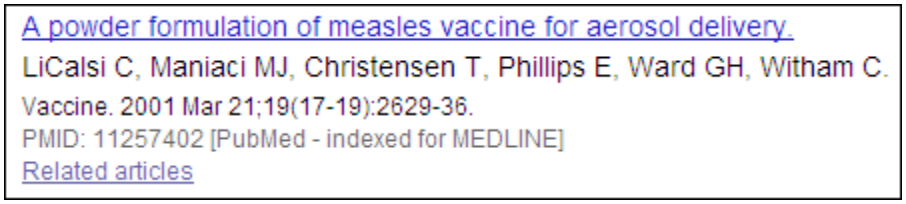
MEDLINE Citations

- After Medical Subject Headings (NLM's controlled vocabulary terms) and other indexing terms are added, the in process citations graduate to MEDLINE records. These "completed" records have also been checked for bibliographic accuracy.

- Fully indexed MEDLINE records carry the status tag **[PubMed – indexed for MEDLINE]**.

- MEDLINE records are added to PubMed Tuesday-Saturday.

Sample MEDLINE citation in PubMed:


A powder formulation of measles vaccine for aerosol delivery.
LiCalsi C, Maniaci MJ, Christensen T, Phillips E, Ward GH, Witham C.
Vaccine. 2001 Mar 21;19(17-19):2629-36.
PMID: 11257402 [PubMed - indexed for MEDLINE]
Related articles

*Notice the **[PubMed – indexed for MEDLINE]** status tag.*

OLDMEDLINE Citations

- About 1.8 million citations (most with no abstracts) are to journal article citations from two printed indexes: *Cumulated Index Medicus (CIM)* and the *Current List of Medical Literature (CLML)* published from 1948 to 1965. To search PubMed for all citations originating from the OLDMEDLINE print index conversion project, use jsubsetom.

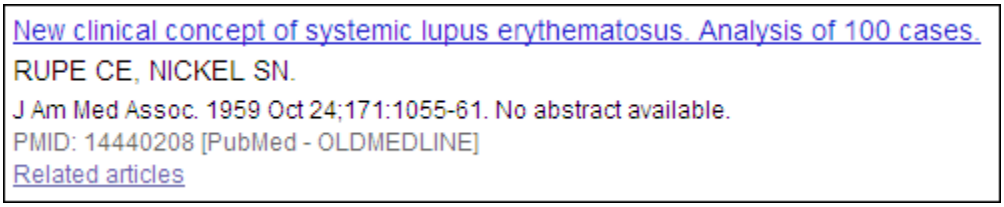
- The citations are from international biomedical journals covering the fields of medicine, preclinical sciences, and allied health sciences.

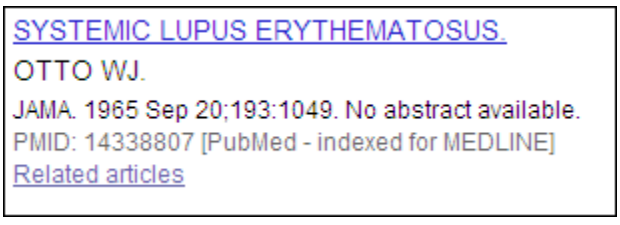
- OLDMEDLINE citations have been created using standards that are different from the data entry standards for MEDLINE records. There are also variations among OLDMEDLINE citations in the data fields present as well as in their format, depending on the original source from which the citations were obtained.

- Beginning in 2005, the original subject terms applied to the citations in the printed indexes are being mapped to current Medical Subject Headings (MeSH).

- OLDMEDLINE records carry the status tag [**PubMed – OLDMEDLINE]** until *all* original subject terms are mapped to current MeSH. Once all terms are mapped, the records are promoted to status **[PubMed – indexed for MEDLINE]**.

Sample OLDMEDLINE citations in PubMed:


New clinical concept of systemic lupus erythematosus. Analysis of 100 cases.
RUPE CE, NICKEL SN.
J Am Med Assoc. 1959 Oct 24;171:1055-61. No abstract available.
PMID: 14440208 [PubMed - OLDMEDLINE]
Related articles


SYSTEMIC LUPUS ERYTHEMATOSUS.
OTTO WJ.
JAMA. 1965 Sep 20;193:1049. No abstract available.
PMID: 14338807 [PubMed - indexed for MEDLINE]
Related articles

Non-MeSH Indexed Citations

- Some citations received electronically from publishers never become MEDLINE citations.
- These records are not indexed with MeSH terms.
- These records have either the status tag **[PubMed]** or **[PubMed – as supplied by publisher]** and remain in PubMed but are not MEDLINE citations.

There are three sources of these types of records:

1. Out-of-scope articles from selectively indexed MEDLINE journals

This may occur when a particular article in a selectively indexed journal is out-of-scope for MEDLINE (such as a geology article in a general scientific journal like *Science* or *Nature*). These citations have been reviewed for accurate bibliographic data.
The status tag **[PubMed]** appears on these citations.

Sample citation for an article that is out of scope for MEDLINE:

Intraslab earthquakes: dehydration of the Cascadia slab.
Preston LA, Creager KC, Crosson RS, Brocher TM, Trehu AM.
Science. 2003 Nov 14;302(5648):1197-200.
PMID: 14615535 [PubMed]
Related articles Free article

*Notice the **[PubMed]** status tag.*

Sample citation for an article from the same journal issue that *is* indexed for MEDLINE:

CLIP identifies Nova-regulated RNA networks in the brain.
Ule J, Jensen KB, Ruggiu M, Mele A, Ule A, Darnell RB.
Science. 2003 Nov 14;302(5648):1212-5.
PMID: 14615540 [PubMed - indexed for MEDLINE]
Related articles Free article

*Notice the **[PubMed – indexed for MEDLINE]** status tag.*

2. Articles from issues of journals published prior to selection for MEDLINE indexing

These earlier citations will not be indexed with MeSH headings.

- Prior to late 2003:
  - ► the citations were *not* reviewed for accurate bibliographic data
  - ► the status tag of **[PubMed – as supplied by publisher]** appears
- Beginning in late 2003:
  - ► the citations have been reviewed for accurate bibliographic data
  - ► the status tag of **[PubMed]** appears.

Example: *NLM began indexing the journal, The Neurologist with v. 9, no. 1, 2003. However, the publisher electronically supplied NLM with citations from earlier volumes. The citations from back volumes were entered into PubMed but will not be indexed with MeSH.*

*Notice the **[PubMed]** status tag from an item from vol. 8, 2002.*

Evaluation and management of the driver with dementia.
Dobbs BM, Carr DB, Morris JC.
Neurologist. 2002 Mar;8(2):61-70.
PMID: 12803692 [PubMed]
Related Articles

Restoring function after spinal cord injury.
Becker D, Sadowsky CL, McDonald JW.
Neurologist. 2003 Jan;9(1):1-15. Review.
PMID: 12801427 [PubMed - indexed for MEDLINE]
Related Articles

*Notice the **[PubMed – indexed for MEDLINE]** status tag on an item from volume 9, 2003.*

Indexing information for a particular journal can be found in the "Indexed In" field in the NLM Catalog. Use PubMed's Journals Database to link to this information.

3. Articles from non-MEDLINE journals

- Beginning in July 2005:
  - ► the citations have been reviewed for accurate bibliographic data
  - ► the status tag of **[PubMed]** appears

Surgical management of abdominal and retroperitoneal Castleman's disease.
Bucher P, Chassot G, Zufferey G, Ris F, Huber O, Morel P.
World J Surg Oncol. 2005 Jun 7;3:33.
PMID: 15941478 [PubMed]
Related articles Free article

- Author manuscripts in PubMed Central (PMC) that would not normally be in PubMed.

Size Controlled Synthesis of Monodispersed, Core/Shell Nanogels.
Blackburn WH, Lyon LA.
Colloid Polym Sci. 2008;286(5):563-569.
PMID: 18769603 [PubMed]
Related articles Free article

See next page for a Citation Status Tags Summary Table.

PubMed Citation Status Tags Summary Table

Citation Status Tag Value	Condition(s)	MeSH-indexed?	Biblio-graphic data checked?	How to search
PubMed - as supplied by publisher				
	• Citations supplied electronically when first received. • Citations from issues of journals published before journal selected for MEDLINE indexing (records received prior to late 2003). • Citations from non-MEDLINE journals (records received prior to June 2005).	No	No	publisher [sb] NOT pubstatusnihms NOT pubstatuspmcsd
PubMed - in process				
	• Citations in review for inclusion in MEDLINE.	No	No	in process [sb]
PubMed - indexed for MEDLINE				
	• Fully indexed citations.	Yes	Yes	medline [sb]
PubMed - OLDMEDLINE				
	• Citations originally printed in hardcopy indexes published from 1948 through 1965 that have not had all of their original subject terms mapped to current MeSH.	Partial	Yes	oldmedline [sb]
PubMed				
	• Out-of-scope articles from selectively indexed MEDLINE journals. • Since late 2003, citations from issues of journals published prior to selection for MEDLINE indexing. • Since June 2005, citations from non-MEDLINE journals. • Citations for articles with full-text in PubMed Central (PMC) that would not normally be in PubMed.	No	Yes	pubmednotmedline [sb] OR (pubstatusnihms OR pubstatuspmcsd AND publisher [sb])

NOTES

Medical Subject Headings (MeSH® Vocabulary)

For a video introduction to MeSH, see *Branching Out: The MeSH Vocabulary* at http://www.nlm.nih.gov/bsd/disted/video/

What is MeSH?

- Acronym for Medical Subject Headings
- Similar to key words on other systems
- Used for indexing journal articles for MEDLINE and also used for cataloging books and audiovisuals
- Used by searchers
- Revised annually
- Gives uniformity and consistency to the indexing of the biomedical literature and is a distinctive feature of MEDLINE

MeSH Vocabulary includes four types of terms:

- Headings
- Publication Types
- Subheadings
- Supplementary Concept Records

MeSH Headings

- MeSH headings represent concepts found in the biomedical literature
- MeSH headings and Publication Types are arranged in a hierarchical manner called the MeSH Tree Structure

Examples of MeSH Headings:

- Body Weight
- Kidney
- Dental Cavity Preparation
- Self Medication
- Radioactive Waste
- Brain Edema

MeSH Tree Structure

- MeSH vocabulary is organized by 16 main branches:

  A. Anatomy
  B. Organisms
  C. Diseases
  D. Chemical and Drugs
  E. Analytical, Diagnostic and Therapeutic Techniques and Equipment
  F. Psychiatry and Psychology
  G. Phenomena and Processes
  H. Disciplines and Occupations
  I. Anthropology, Education, Sociology and Social Phenomena
  J. Technology, Industry, Agriculture
  K. Humanities
  L. Information Science
  M. Named Groups
  N. Health Care
  V. Publication Characteristics
  Z. Geographic Locations

- Each Descriptor has a tree number that positions the term in the hierarchy.

  Eye [A01.456.505.420]
  Eyebrows [A01.456.505.420.338]
  Eyelids [A01.456.505.420.504]
  Eyelashes [A01.456.505.420.504.421]

- Some terms have multiple tree numbers because they appear in more than one place in the hierarchy.

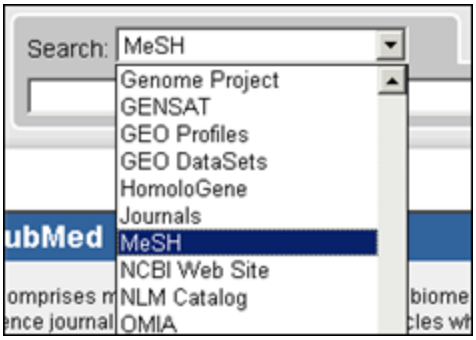
- By having narrower terms indented under broader terms, a search of a broad term can automatically include the narrower terms. This is known as an EXPLODE.

MeSH Database

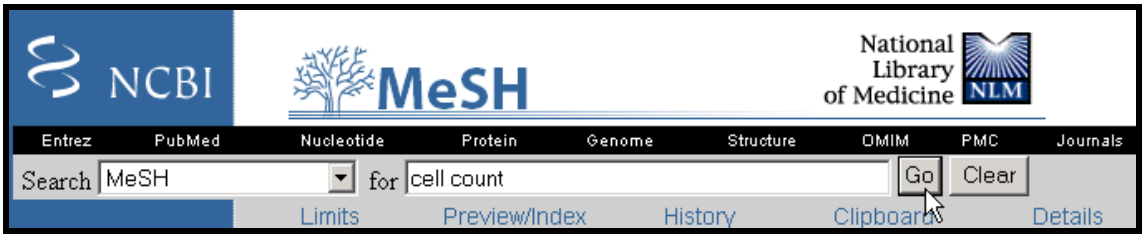
- MeSH is the name of an Entrez database that assists PubMed users in locating appropriate terms for searches. This database provides information about MeSH terms including:
    - Definitions
    - Synonyms for the concept
    - Related terms
    - The position of the headings in the MeSH hierarchy

- We can use the MeSH database to look at the type of information associated with each MeSH term:

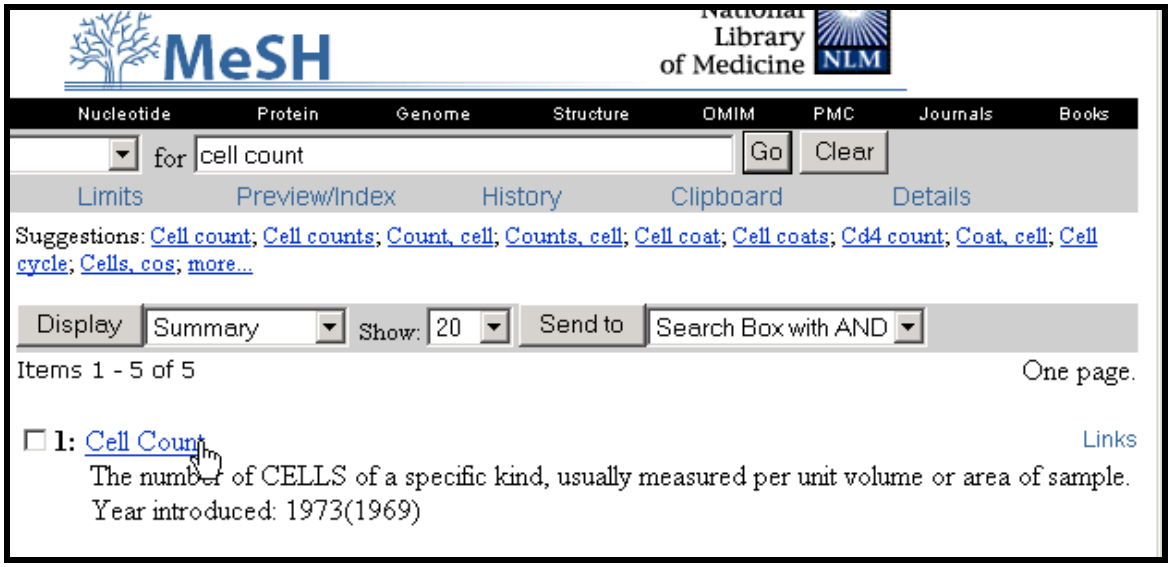
*Click on **MeSH Database** on the homepage* or select **MeSH** from the database selection box and click **Search**:



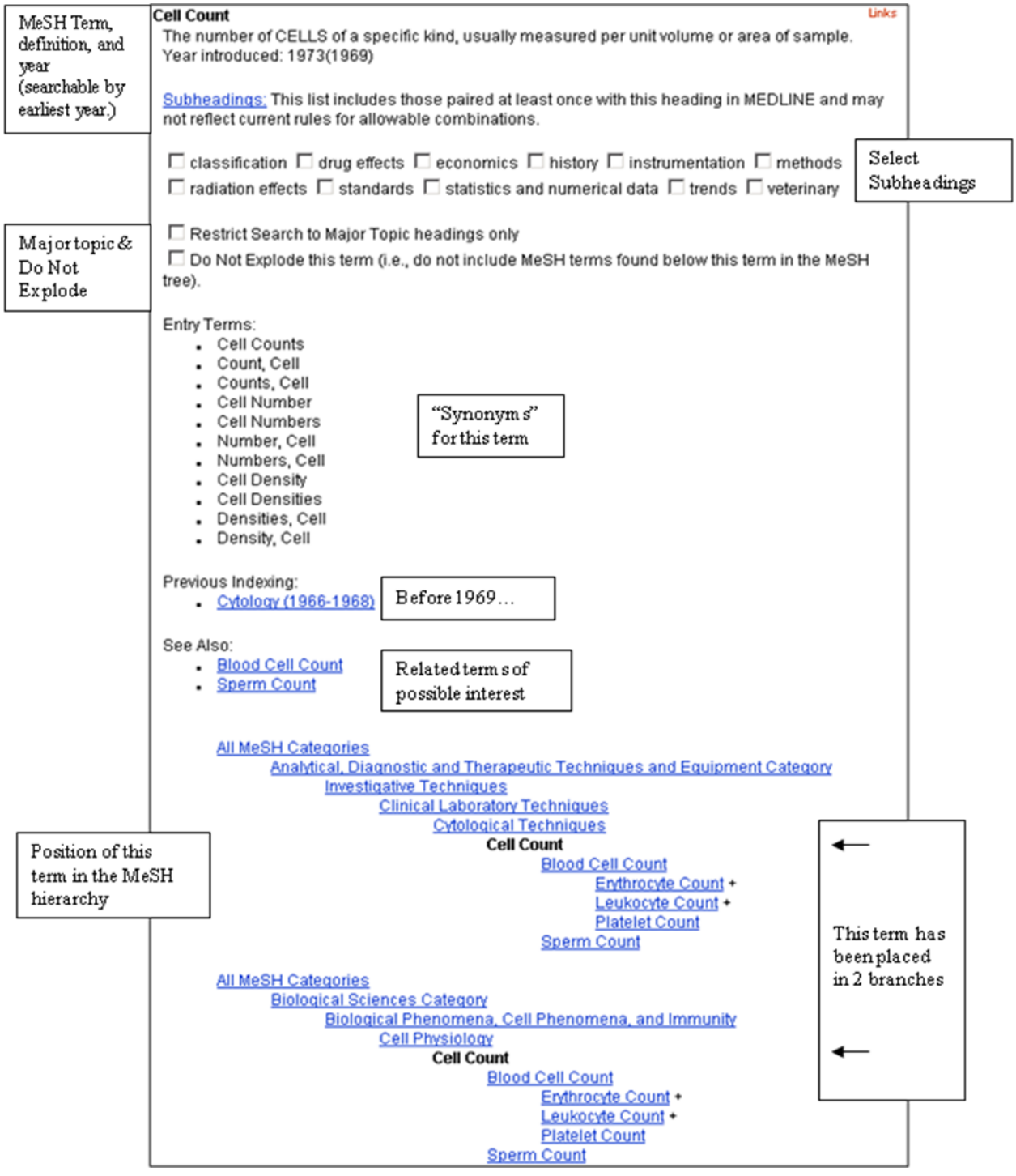
Enter **cell count** and click on **Go**:



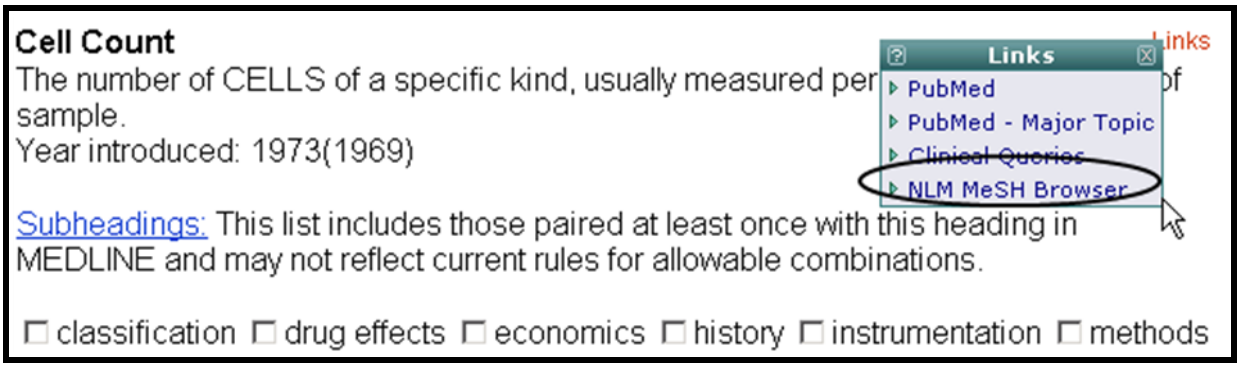
In the retrieval, click on **Cell Count**:



This displays the full record for **Cell Count**:



Use the Links menu to go to the **NLM MeSH Browser** for additional information:



The **NLM MeSH Browser** is the tool used by MEDLINE indexers and catalogers.

National Library of Medicine - Medical Subject Headings

2009 MeSH

MeSH Descriptor Data

Return to Entry Page

Standard View. Go to Concept View; Go to Expanded Concept View

MeSH Heading	Cell Count
Tree Number	E05.200.500.195
Tree Number	G04.170
Annotation	usually NIM; not for micro-organisms
Scope Note	The number of CELLS of a specific kind, usually measured per unit volume or area of sample.
Entry Term	Cell Density
Entry Term	Cell Number
See Also	Blood Cell Count
See Also	Sperm Count
Allowable Qualifiers	CL EC ES HI IS MT SN ST TD UT VE
Previous Indexing	Cytology (1966-1968)
Online Note	use CELL COUNT to search CELL NUMBER 1978-79
History Note	73(69); CELL NUMBER was heading 1978-79
Date of Entry	19990101
Unique ID	D002452

Indexing with MeSH Headings

- NLM's MEDLINE indexers examine articles and assign the most specific MeSH heading(s) appropriate to describe the main concepts discussed.
- When there is no single specific MeSH heading for a concept, the indexer will use the closest, more general MeSH heading available.
- The indexer will assign as many MeSH headings as appropriate to cover the topics of the article (generally 5 to 15).
- The MeSH terms that reflect the major points of the article are marked with an asterisk (*) by indexers.
- Information the indexer provides includes:
  - topic of article
  - age group of population studied
  - human vs. animal studies
  - male vs. female studies
  - type of article (e.g., review article)

Article Title:
Hormone therapy in perimenopausal and postmenopausal women: examining the evidence on cardiovascular disease risks.

Abstract:
Women may live for 30 years or longer after menopause with cardiovascular disease as their highest mortality risk. Menopause may correspond to health alterations for women, yet the use of estrogen during and after this transition has been controversial for the past four decades. The evidence from recent scientific studies does not support the use of hormone therapy for the prevention or treatment of cardiovascular disease, which has resulted in its removal from national guideline recommendations. However, because of concerns related to specific aspects of the research, there are gaps in the evidence. Studies are under way to evaluate alternate methods for hormone delivery, low-dose hormone therapy, and selective estrogen receptor modulators (SERMs) in reducing cardiovascular risks in perimenopausal and postmenopausal women. Implications for clinical nursing practice include education as well as assessment and counseling related to individual risk factors.

Publication Types:
Review

MeSH Terms:
Aged
Cardiovascular Diseases/chemically induced*
Estrogen Replacement Therapy/adverse effects*
Evidence-Based Medicine
Female
Humans
Middle Aged
Perimenopause*
Postmenopause*
Risk Factors

Subheadings

- Subheadings further describe a particular aspect of a MeSH heading.

The entire list of subheadings follows:

Abnormalities	ab	Isolation & purification	ip
Administration & dosage	ad	Legislation & jurisprudence	lj
Adverse effects	ae	Manpower	ma
Agonists	ag	Metabolism	me
Analogs & derivatives	aa	Methods	my
Analysis	an	Microbiology	mi
Anatomy & histology	ah	Mortality	mo
Antagonists & inhibitors	ai	Nursing	nu
Biosynthesis	bi	Organization & administration	og
Blood	bl	Parasitology	ps
Blood supply	bs	Pathogenicity	py
Cerebrospinal fluid	cf	Pathology	pa
Chemical synthesis	cs	Pharmacokinetics	pk
Chemically induced	ci	Pharmacology	pd
Chemistry	ch	Physiology	ph
Classification	cl	Physiopathology	pp
Complications	co	Poisoning	po
Congenital	cn	Prevention & control	pc
Contraindications	ct	Psychology	px
Cytology	cy	Radiation effects	re
Deficiency	df	Radiography	ra
Diagnosis	di	Radionuclide imaging	ri
Diagnostic use	du	Radiotherapy	rt
Diet therapy	dh	Rehabilitation	rh
Drug effects	de	Secondary	sc
Drug therapy	dt	Secretion	se
Economics	ec	Standards	st
Education	ed	Statistics & numerical data	sn
Embryology	em	Supply & distribution	sd
Enzymology	en	Surgery	su
Epidemiology	ep	Therapeutic use	tu
Ethics	es	Therapy	th
Ethnology	eh	Toxicity	to
Etiology	et	Transmission	tm
Genetics	ge	Transplantation	tr
Growth & development	gd	Trends	td
History	hi	Ultrasonography	us
Immunology	im	Ultrastructure	ul
Injuries	in	Urine	ur
Innervation	ir	Utilization	ut
Instrumentation	is	Veterinary	ve
		Virology	vi

Subheading Groupings

- Related subheadings have been grouped to allow for additional, relevant retrieval.
- Not all subheadings have been placed in these groupings – some do not logically fit.

Families of Subheading Explosions

adverse effects
- poisoning
- toxicity

analysis
- blood
- cerebrospinal fluid
- isolation & purification
- urine

anatomy & histology
- blood supply
- cytology
  - pathology
  - ultrastructure
- embryology
  - abnormalities
- innervation

chemistry
- agonists
- analogs & derivatives
- antagonists & inhibitors
- chemical synthesis

complications
- secondary

cytology
- pathology
- ultrastructure

diagnosis
- pathology
- radiography
- radionuclide imaging
- ultrasonography

embryology
- abnormalities

epidemiology
- ethnology
- mortality

etiology
- chemically induced
- complications
  - secondary
- congenital
- embryology
- genetics
- immunology
- microbiology
  - virology
- parasitology
- transmission

metabolism
- biosynthesis
- blood
- cerebrospinal fluid
- deficiency
- enzymology
- pharmacokinetics
- urine

microbiology
- virology

organization & admin
- economics
- legislation & jurisprudence
- manpower
- standards
- supply & distribution
- trends
- utilization

pharmacology
- administration & dosage
- adverse effects
  - poisoning
  - toxicity
- agonists
- antagonists & inhibitors
- contraindications
- diagnostic use
- pharmacokinetics

physiology
- genetics
- growth & development
- immunology
- metabolism
  - biosynthesis
  - blood
  - cerebrospinal fluid
  - deficiency
  - enzymology
  - pharmacokinetics
  - urine
- physiopathology
- secretion

statistics & numerical data
- epidemiology
  - ethnology
  - mortality
- supply & distribution
- utilization

surgery
- transplantation

therapeutic use
- administration & dosage
- adverse effects
- contraindications
- poisoning

therapy
- diet therapy
- drug therapy
- nursing
- prevention & control
- radiotherapy
- rehabilitation
- surgery
  - transplantation

Pharmacologic Action Terms

Every drug and chemical MeSH heading has been assigned one or more headings that describe known pharmacological actions (PA).

- Since 1996, NLM indexers add the appropriate pharmacological action MeSH heading as well as the specific chemical MeSH heading to a citation when the action of the chemical is discussed in the article.

Example:

The pharmacological actions established for the MeSH Heading, ***Aspirin****:*

Pharmacological Action	Anti-Inflammatory Agents, Non-Steroidal
Pharmacological Action	Cyclooxygenase Inhibitors
Pharmacological Action	Fibrinolytic Agents
Pharmacological Action	Platelet Aggregation Inhibitors

- A citation to an article that discusses **aspirin used as an anti-inflammatory agent** will be assigned:

  Aspirin
  Anti-Inflammatory Agents, Non-Steroidal

- A citation to an article that discusses **aspirin used to inhibit blood clotting** will be assigned:

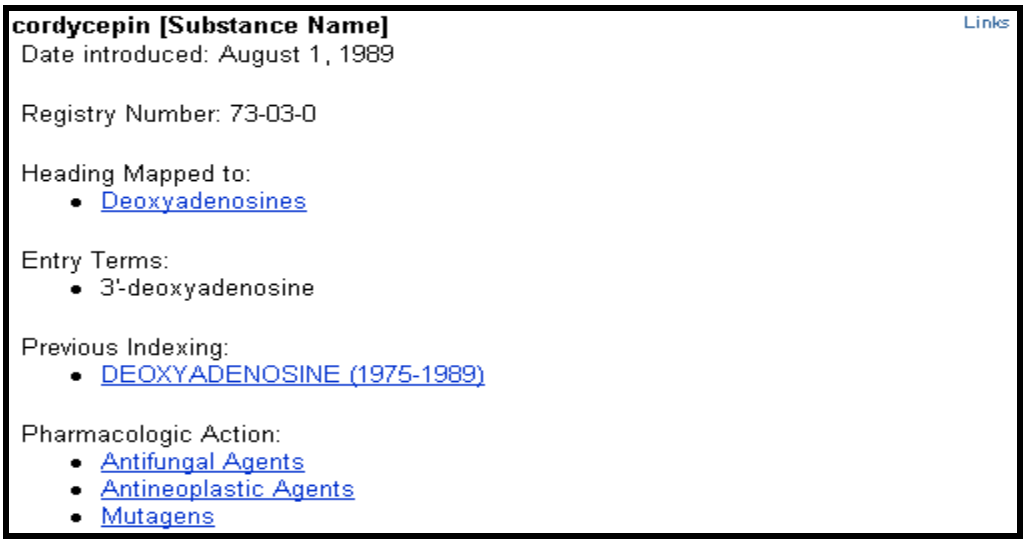
  Aspirin
  Platelet Aggregation Inhibitors

See "The Basics of MeSH in MEDLINE/PubMed" (http://www.nlm.nih.gov/bsd/disted/mesh/), linked from Tutorials on the PubMed home page for information on searching with pharmacologic action terms.

Other Types of MeSH Vocabulary

Supplementary Concepts

- Over 180,000 terms.
- Display in RN field on MEDLINE record.



The data in a Supplemental Concept MeSH Database record may include:

- Name of substance: For example: cordycepin
- Date Introduced: The date the record was added to the vocabulary
- Registry Number: For example: 73-03-0. A unique number assigned to chemicals by the Chemical Abstract Service, or a code for enzymes assigned by the Commission on Biological Nomenclature. May display as zero (0), generally for terms for a group or class of compounds.
- Heading Mapped to: The MeSH term used for indexing this chemical in MEDLINE
- Entry Term: Synonyms that can be used for searching this concept
- Previous Indexing: MeSH terms used before the current term became available
- Pharmacologic Action: An action of a drug or chemical as reported in the literature, e.g., Antifungal Agents or Antineoplastic Agents

Age Group MeSH Headings

These are MeSH headings which indicate the age of human subjects discussed in the article:

Infant, Newborn	Birth to 1 month
Infant	1 to 23 months
Child, Preschool	2 to 5 years
Child	6 to 12 years
Adolescent	13 to 18 years
Young Adult	19 to 24 years
Adult	19 to 44 years
Middle aged	45 to 64 years
Aged	65 to 79 years
80 and over	80+

Publication Types

- Publication Types describe the type of material being indexed.
- The most common type is Journal Article. Other Publication Types include:

Clinical Trial
Retraction of Publication
Comment
Review
Practice Guideline
Twin Study
Retracted Publication

- Publication Types may be searched in the MeSH Database. Definitions are provided.
- They are part of the MeSH hierarchy (V category).

NOTES

Practice Exercises – Introduction to MeSH

Use the **MeSH Database** to find the answers to these questions:

1. If you search the term "phytotherapy" in PubMed, what terms are you also searching?

2. How far back can you search with the MeSH term, "Proteomics?"

3. What ages are included by the term, "Child?"

4. What is the preferred MeSH term for "chewing?"

Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

Suggested Answers – Introduction to MeSH

Use the MeSH Database to find the answers to these questions:

1. If you search the term "phytotherapy" in PubMed, what terms are you also searching?

   Aromatherapy and Eclecticism, Historical

2. How far back can you search with the MeSH term, "Proteomics?"

   To 2003. For 2000-2002, use Proteome.

3. What ages are included by the term, "Child?"

   6 to 12 years.

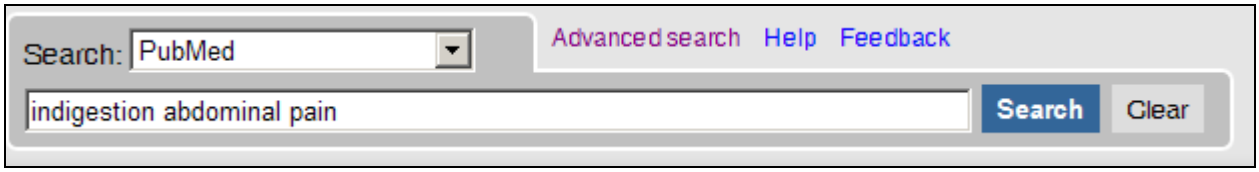
4. What is the preferred MeSH term for "chewing?"

   Mastication.

Building the Search

Basic Searching

Search: *Find citations to articles about indigestion and abdominal pain.*



Entering Search Terms

- Enter significant terms in the search box (e.g., ***indigestion abdominal pain***).
- Click on the **Search** button.
- Go to **Advanced Search** and View **Details** to check PubMed's translation (more about this later in the workbook)
- Use the **Clear** button to erase the contents of the search box.

Search Results Screen

Once you click on **Search** or press the Enter key, PubMed will automatically:

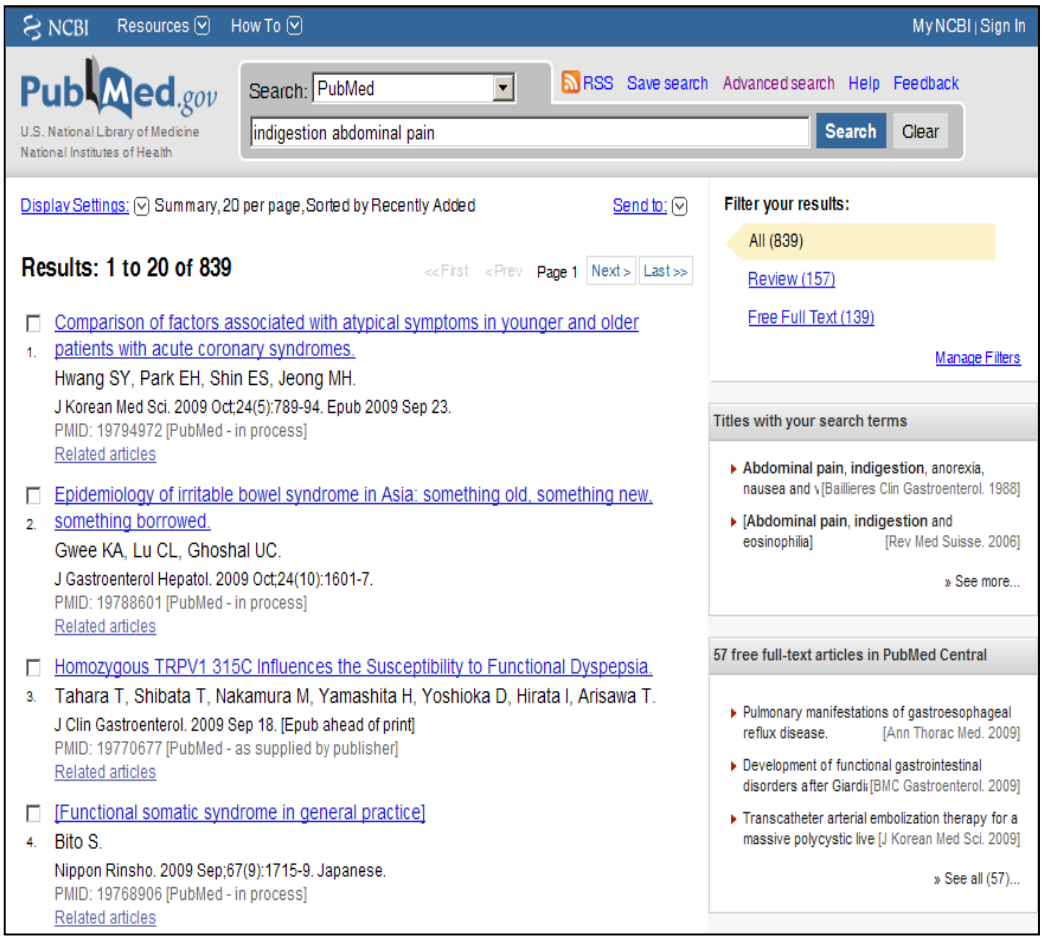
- Run the search
- Retrieve and display citations (results displayed in last in, first out order)
- Provide the option to Save Search via My NCBI feature and an option to save the search to an RSS feed

Results screen returned by PubMed for *melatonin insomnia* search. More about results will be covered in the **Managing the Results** section beginning on page 99.

Active **search box** displaying current search

Modifiable **Display settings** and **Send to:** options

Citations are displayed in **Summary** format



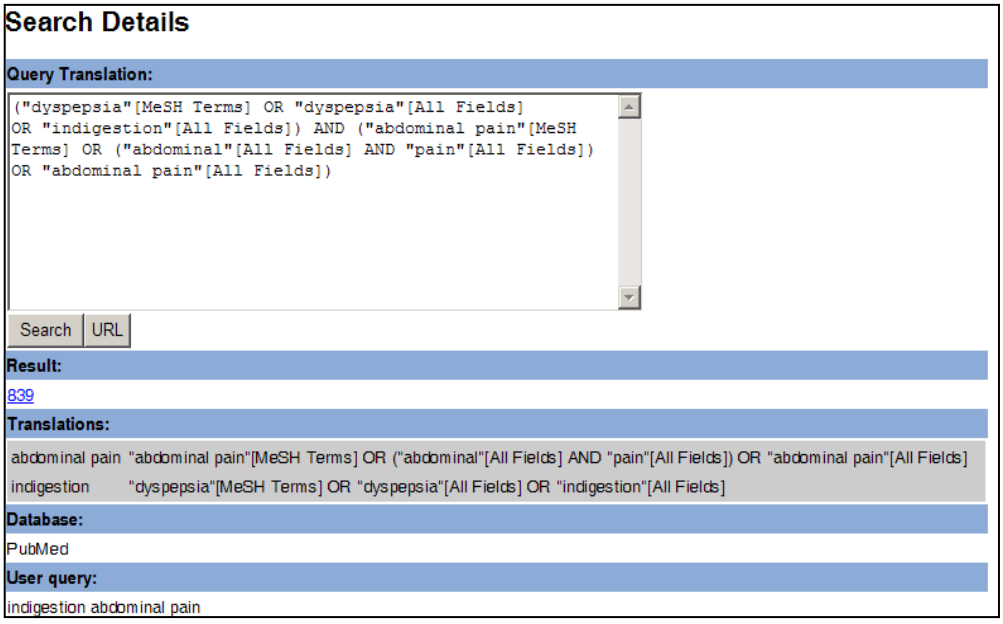
Automatic Term Mapping (ATM)

Details screen

You can see how PubMed processes your search by clicking on Advanced Search, adjacent to the search box buttons,

then clicking on **Details**:

The Search Details page shows how your terms are translated or *mapped* to terms indexed in the database.



See page 59 for explanation of Boolean logical operators (AND, OR)

***Translations** are shown in the grey box towards the bottom of the screen.*

Unqualified terms that are entered in the search box are matched against:

- Subjects, using the
  - MeSH (Medical Subject Headings) Translation Table
- Journals, using the
  - Journals Translation Table
- Authors and Investigators, using the
  - Full Author Translation Table
  - Author Index
  - Full Investigator Translation Table
  - Investigator Index

1. MeSH Translation Table contains:

- MeSH Headings
- Subheadings
- Publication Types
- Entry Term mappings (also known as synonyms) for MeSH terms
- Mappings derived from the Unified Medical Language System (UMLS)
- Supplementary Concepts and synonyms to the Supplementary Concepts

If a match is found in this translation table:
- the term will be mapped to the appropriate MeSH term and searched as MeSH
- the searcher's term and the mapped MeSH term will be searched in All Fields

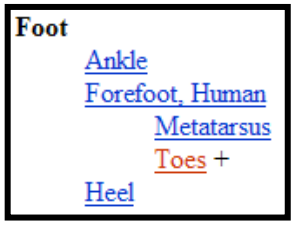
Example:

PubMed's Translation:
""foot"[MeSH Terms] OR "foot"[All Fields] OR "feet"[All Fields]

- Feet is an Entry Term for the MeSH term, Foot.

When a term is searched as a MeSH Heading, PubMed automatically searches that heading and the more specific headings underneath in the hierarchy. This is called exploding a term.

For example, when searched as a MeSH Term, PubMed will search the heading Foot as well as the more specific term(s) in the hierarchy:



Matching phrases are searched in All Fields as a phrase and broken into individual words, with the exception of phrases mapping to Supplementary Concepts (substances) or MeSH Headings that include a standalone number or single character. These are searched only as phrases in All Fields.

Example:

PubMed's Translation:
"muscular atrophy"[MeSH Terms] OR ("muscular"[All Fields] AND "atrophy"[All Fields]) OR "muscular atrophy"[All Fields] OR ("muscle"[All Fields] AND "atrophy"[All Fields]) OR "muscle atrophy"[All Fields]

Example:

PubMed's Translation:
"protein c"[MeSH Terms] OR "protein c"[All Fields]

2. Journals Translation Table contains:

- Full journal title
- MEDLINE abbreviation
- International Standard Serial Number (ISSN)

Example:

PubMed Translation:
"J Cell Biol"[Journal] OR "the journal of cell biology"[All Fields]

If a name of a journal also happens to be a MeSH term or a one-word title, PubMed will search the term as a MeSH heading and in All Fields. For example, the search for *Science* untagged will search: "science"[MeSH Terms] OR "science"[All Fields]. To limit your search to a journal title, use the Limits page or use the tag [ta], e.g., science [ta]

3. Full Author Translation Table includes:

- Full author names for articles published from **2002 forward and to journals that publish using the full names of authors**.

- Full author searching can be entered in natural or inverted order:

  julia s wong
  wong julia s

- When searching a full name using the inverted order, a comma following the last name is generally optional, omit periods after initials, and put all suffixes, e.g., Jr, at the end. For example, to search for the author Bruce J. Herron, you may use any of the following formats:

  herron, bruce j
  herron bruce j
  bruce j herron

- For some names, however, it is necessary to distinguish which name is the last name by using the comma following the last name:

  ryan, james
  james, ryan

- Full author name searching allows for automatic truncation of the forename. If you don't know the middle initial, enter only the last and first names:

  herron bruce

4. Author Index

- Author's names, for all years of publication, are included in the form of Last Name (space) Initials. Use this format for searching.

  Examples: *o'brien jm*
  adams sh
  pogonka t

- If only the first initial is used, PubMed automatically truncates the author's name to account for varying initials.

Example:

This search retrieves citations to articles written by o'brien j, o'brien ja, o'brien jz, etc.

If only an author's last name is entered, PubMed will search that name in All Fields (Author field plus all other searchable fields). It will not default to the Author Index because the last name is not followed by an initial. When the last name is the same as a MeSH term, PubMed will search the term in MeSH as well as in All Fields. To limit a search to an author's name, use Limits or use the tag [au], e.g., o'brien [au].

5. Full Investigator Translation Table and Investigator Index

- Investigators are individuals who contributed to the research, but may not have participated in writing the article.

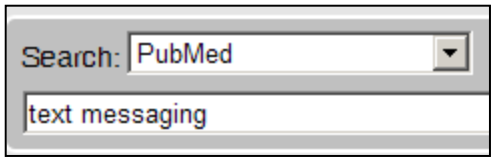
- The names in the Full Investigator Translation Table and the Investigator Index are formatted and searchable in the same way as the Full Author Name Table and Author Index (see above).

If no match is found?

- PubMed breaks apart the phrase and repeats the automatic term mapping process until a match is found.

- Terms that don't make a match will be searched in "All Fields." Individual terms will be combined (ANDed) together.

Example:

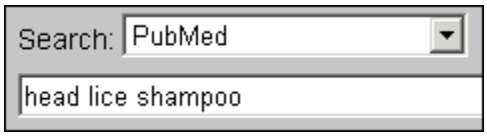


PubMed Translation:

text[All Fields] AND messaging[All Fields]

- PubMed breaks apart a long phrase from right to left:

Example:



Searches for:	**Results:**	**Action:**
head lice shampoo	No match found	Removes term on right to re-run Automatic Term Mapping process.
head lice	Match found in MeSH Translation Table	***head lice*** will be searched as ***"pediculus"[MeSH Terms] OR "pediculus"[All Fields] OR ("head"[All Fields] AND "lice"[All Fields]) OR "head lice"[All Fields]***
shampoo	No match found in Translation Tables	***shampoo*** will be searched as ***shampoo[All Fields]***

PubMed then combines (ANDs) the terms to produce a single search strategy:

"pediculus"[MeSH Terms] OR "pediculus"[All Fields] OR ("head"[All Fields] AND "lice"[All Fields]) OR "head lice"[All Fields]
AND
shampoo[All Fields]

N O T E S

Practice Exercises: Basic Search and ATM

1. Find references about shingles and facial paralysis. To what MeSH Heading does shingles map? (Hint: Use the Details link from the Advanced Search screen.)

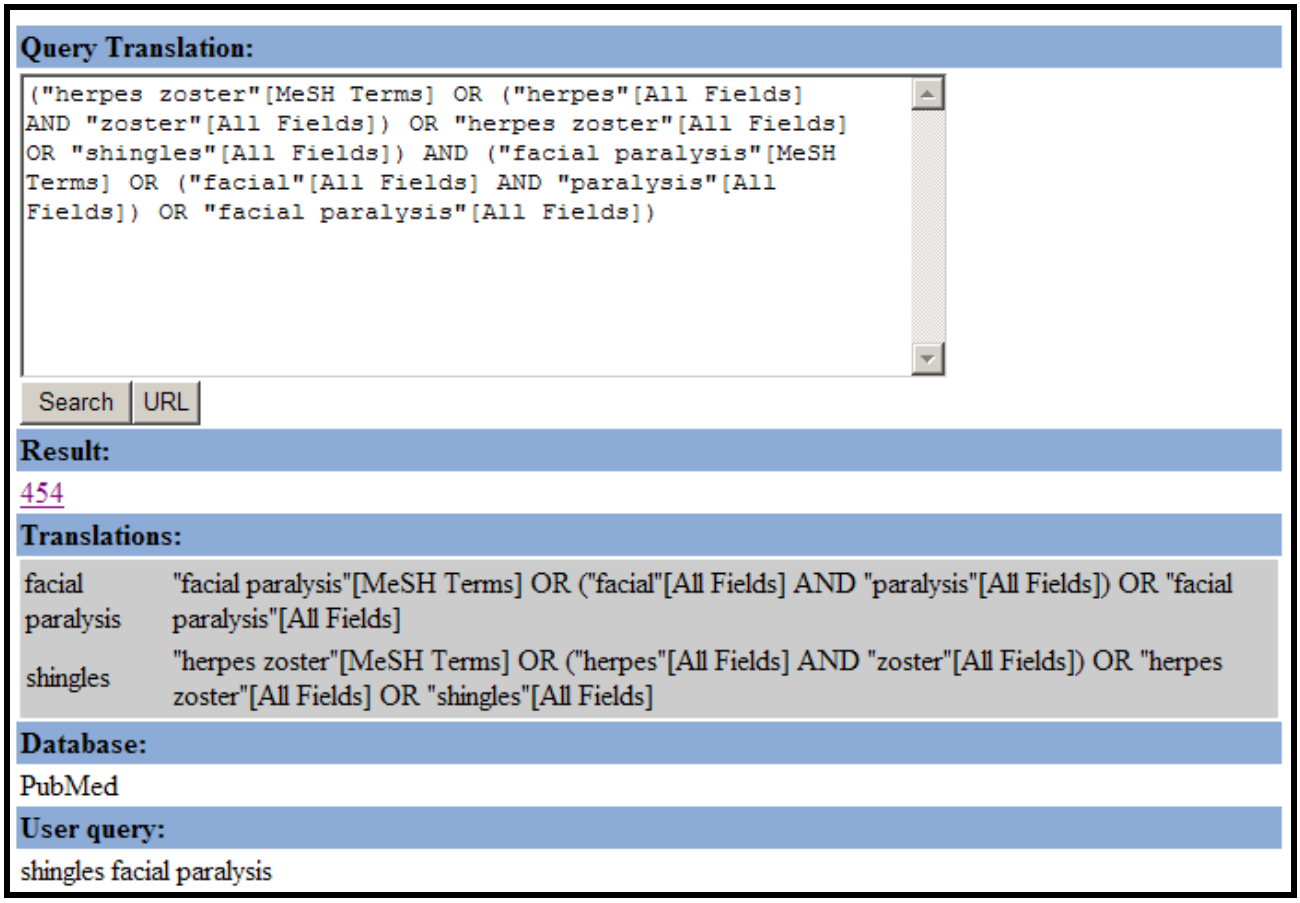
2. Find references about hypertension and a nosebleed. How does PubMed map the term, nosebleed?

Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

Suggested Answers: Basic Search and ATM

1. Find references about shingles and facial paralysis. To what MeSH Heading does *shingles* map? (Hint: Use the Details link from the Advanced Search screen.)

Enter shingles facial paralysis in the search box, click **Search**. Click on **Advanced Search**, **Details** to see that the term shingles maps to the MeSH heading **Herpes Zoster**.



Query Translation:

```
("herpes zoster"[MeSH Terms] OR ("herpes"[All Fields]
AND "zoster"[All Fields]) OR "herpes zoster"[All Fields]
OR "shingles"[All Fields]) AND ("facial paralysis"[MeSH
Terms] OR ("facial"[All Fields] AND "paralysis"[All
Fields]) OR "facial paralysis"[All Fields])
```

Search URL

Result:

454

Translations:

facial paralysis	"facial paralysis"[MeSH Terms] OR ("facial"[All Fields] AND "paralysis"[All Fields]) OR "facial paralysis"[All Fields]
shingles	"herpes zoster"[MeSH Terms] OR ("herpes"[All Fields] AND "zoster"[All Fields]) OR "herpes zoster"[All Fields] OR "shingles"[All Fields]

Database:

PubMed

User query:

shingles facial paralysis

2. Find references about hypertension and a nosebleed. How does PubMed map the term, nosebleed?

Enter hypertension nosebleed in the search box and click **Search**. Click on **Advanced Search**, **Details**.

Details:

Query Translation:

```
("hypertension"[MeSH Terms] OR "hypertension"[All Fields])
AND ("epistaxis"[MeSH Terms] OR "epistaxis"[All Fields]
OR "nosebleed"[All Fields])
```

Search URL

Result:

189

Translations:

hypertension	"hypertension"[MeSH Terms] OR "hypertension"[All Fields]
nosebleed	"epistaxis"[MeSH Terms] OR "epistaxis"[All Fields] OR "nosebleed"[All Fields]

Database:

PubMed

User query:

hypertension nosebleed

The term, nosebleed, maps to the MeSH heading, **epistaxis**.

Related Articles

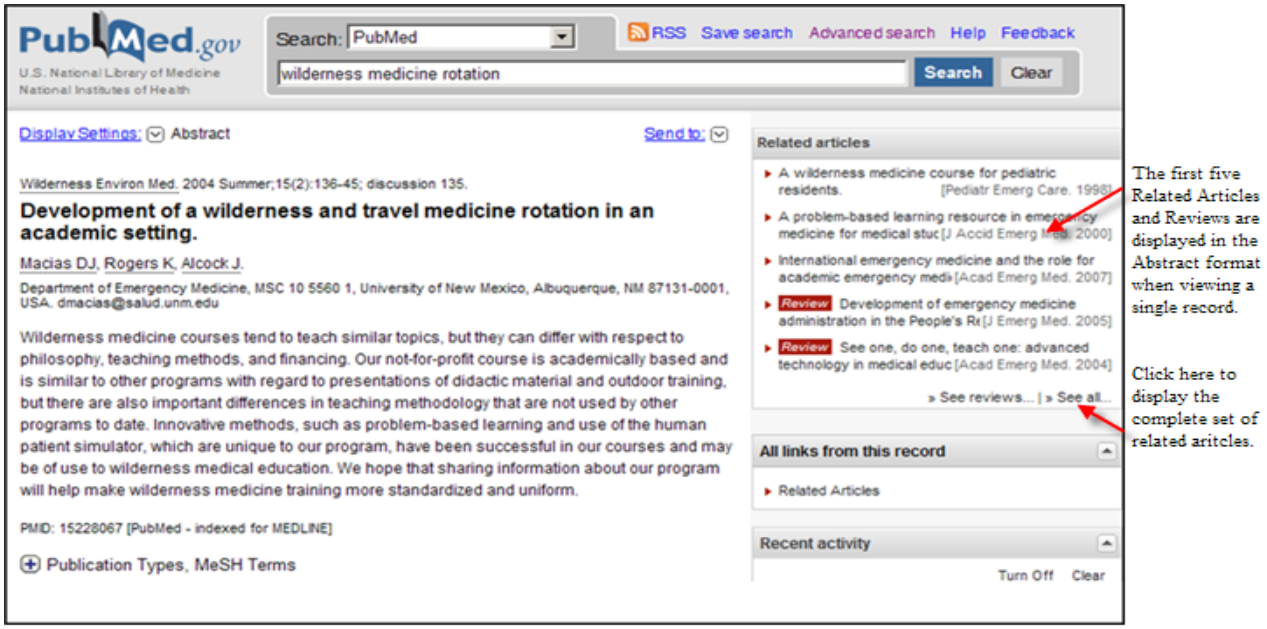
- Citations in PubMed have a **Related Articles** link. Clicking on this link will access the citations in PubMed that are most closely related to the original citation.

- To create this list of Related Articles PubMed compares words from the Title and Abstract of each citation, as well as the MeSH headings assigned, using a powerful word-weighted algorithm.

- The Related Articles citations display is in rank order from most to least relevant. The citation you linked from is displayed first.

A detailed explanation of the Related Articles algorithm is available in the PubMed **Help** (Search Related Articles; then click on "Finding articles related to a citation"; then click on the "algorithm" link.)

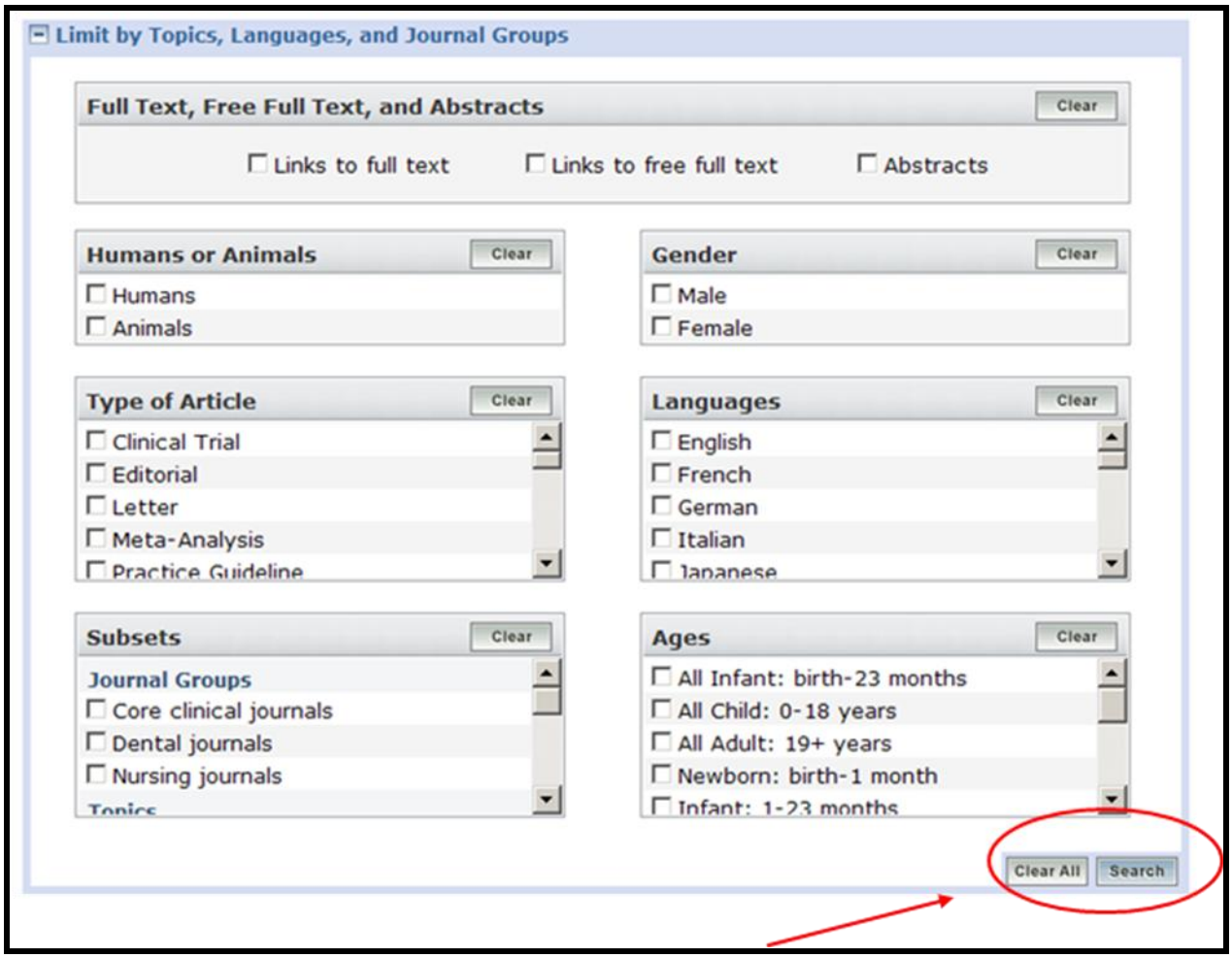
Example: *Find citations to articles about a wilderness medicine rotation.*



The Abstract display of a single record

Limits in Advanced Search

Limits area of the Advanced Search screen



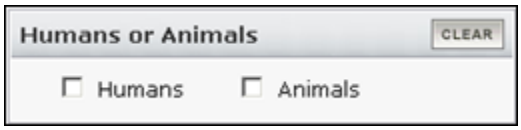
Note the **Clear All** and **Search** buttons.

Limit to Full Text, Free Full Text, and Abstracts

Click the appropriate checkboxes.

Limiting to Humans or Animals

- Use to limit to a specific group.
- If both options are checked, they are ANDed together.

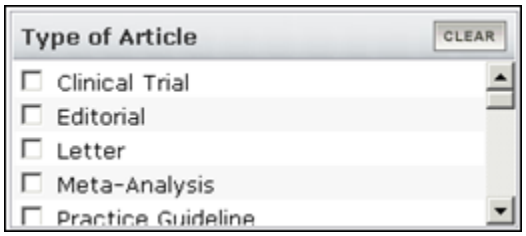


Limiting to Gender

- Use to limit to gender.
- If both options are checked, they are ANDed together.

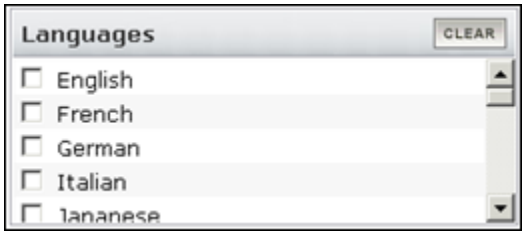
Limiting by Type of Article (Publication Type)

- Use to limit your retrieval based on the type of material the citation represents.
- The selections at the top are frequently searched publication types.
- Scroll down to find an alphabetic list of more publication types.
- Multiple selections are allowed (ORed together).



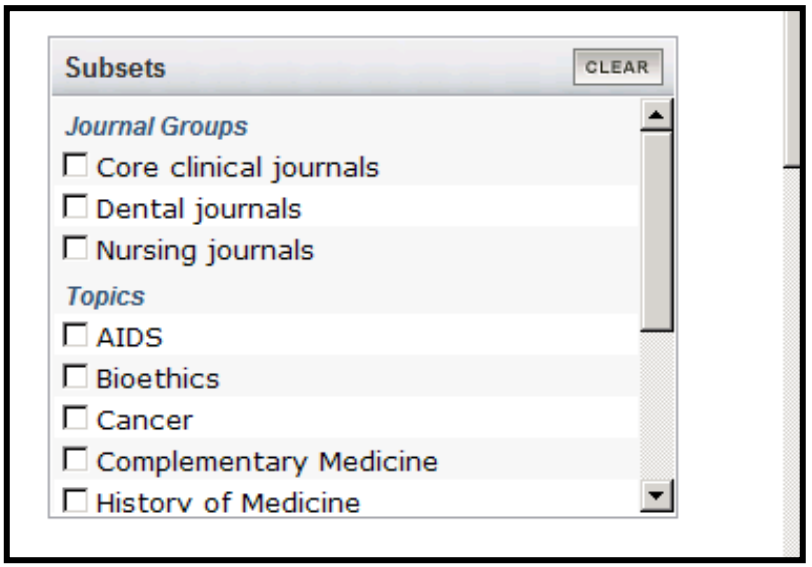
Limiting to Languages

- Journals published in approximately forty languages are indexed.
- The selections at the top are frequently searched languages.
- Scroll down to find a complete alphabetic list of more languages.
- Multiple selections are allowed (ORed together).



Subset Limits

Allows you to limit your retrieval to 3 types of groupings of records:



1. Journal Groups:
   - Core clinical journals: 120 English-language journals from the formerly published *Abridged Index Medicus*
   - Dental
   - Nursing

2. Topics:
   - AIDS
   - Bioethics
   - Cancer
   - Complementary Medicine
   - History of Medicine
   - Space Life Sciences
   - Systematic Reviews
   - Toxicology

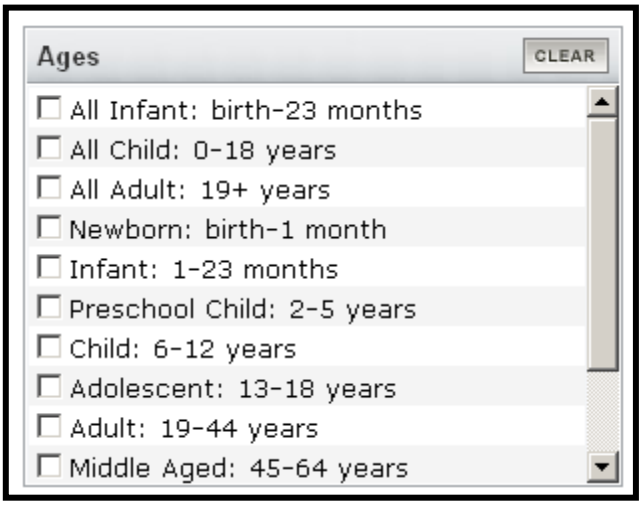
3. More Subsets:
   - MEDLINE: completed citations with MeSH headings and other indexing terms that have also been checked for accuracy
   - PubMed Central: citations for articles available free in NLM's archive of life sciences journal literature

- Multiple selections are allowed (ORed together).

Each Subject Subset uses its own specialized search strategy to aid in the retrieval of citations on these topics. You may view these strategies at http://www.nlm.nih.gov/bsd/pubmed_subsets.html.

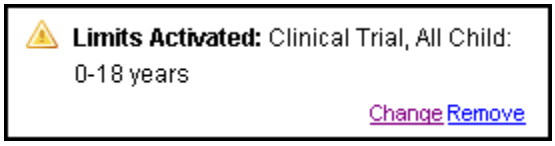
Limiting to Ages

Use to search for a specific age group or multiple age groups (ORed together).



Limits Indicator

- If you run a search, the limits in effect will appear in the top right of your results screen:



- Use the Change link to modify your selections.

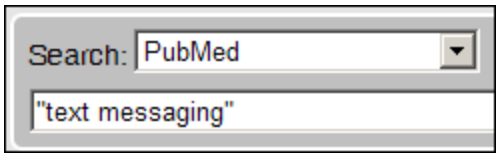
To **turn off all of the limits** before you run your next search, click the **Remove** link or the Clear All button in the Limits section of the Advanced Search screen.

Phrase Searching

PubMed searches for phrases under these conditions:

1. The phrase is found in the MeSH, journal, author or investigator tables or indexes during the automatic term mapping process
2. The phrase is entered with a search tag:
   kidney allograft [tw]
3. The phrase is enclosed in double quotes: (The absence of a search tag indicates the search should be conducted in All Fields.)
   "*kidney allograft*"
4. The term is hyphenated:
   first-line
5. The term is truncated:
   *kidney allograft**

Example:



PubMed Translation: "text messaging"[All Fields]

- The above formats for phrase searching instruct PubMed to bypass automatic term mapping. Instead PubMed looks for the phrase in its Index of searchable terms. If the phrase is in the Index, PubMed will retrieve citations that contain the phrase.

- PubMed may fail to find a phrase because it is not in the Index.

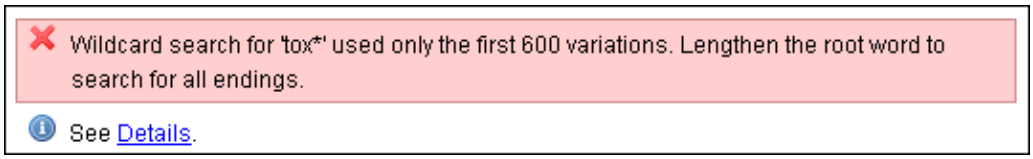
When you enclose a phrase in double quotes, PubMed will ***not*** perform automatic term mapping which includes explosions of MeSH terms. For example, "health planning" ***will*** include citations that have the MeSH heading, Health Planning, but ***will not*** include the more specific indentations (e.g., Health Care Rationing, Health Care Reform) that are included with automatic MeSH mapping and explosion.

Truncation (finding all terms that begin with a given text string)

- Place an asterisk (*) at the end of a string of characters to search for all terms that begin with that string. The asterisk may only be used at the ***end*** of a string of characters.

Example: *mimic* will find all terms that begin with the letters m-i-m-i-c-; e.g., mimic, mimics, mimicing.*

- PubMed searches the first 600 variations of a truncated term. If a truncated term, e.g., tox*, produces more than 600 variations, PubMed displays the following warning message on the Results screen in pink near the top of the screen:



Truncation turns off automatic term mapping. For example, heart attack* will not map to the MeSH term, Myocardial Infarction or include any of its more specific terms, e.g., Myocardial Stunning.

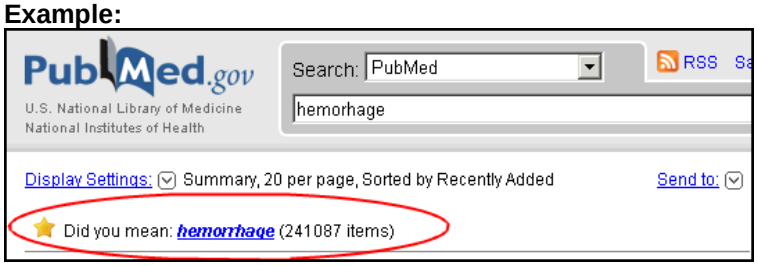
Stopword List

- PubMed also compares each search to a list of commonly found terms that are referred to as "stopwords." Stopwords may be ignored. This list is available in PubMed's Help.

Spell Check Feature

- Suggests alternative spellings for search terms that include misspellings.
- Terms entered with a search tag (e.g., [mh]; [majr]; [tw]) will *not* generate alternative spellings.

Example:



Click on the hyperlinked alternative spelling to generate that search.

- The alternative spellings are not based on a dictionary but rather the frequency with which a term appears in PubMed.
- The spell checking function will not display an alternative spelling for misspellings that have a high frequency of occurrence in PubMed or for terms with numbers or fewer than five characters.

Practice Exercises: Limits in Advanced Search & Phrase Searching

1. Using only the search box, find some information about using a living donor for a liver transplantation. Using the Limits area in the Advanced Search screen, further restrict the search to the publication type (Type of Article), Clinical Trial.

2. Compare the searches "wisdom teeth" and wisdom teeth (with and without quotes), using the Details link on the Advanced Search screen. What accounts for the difference?

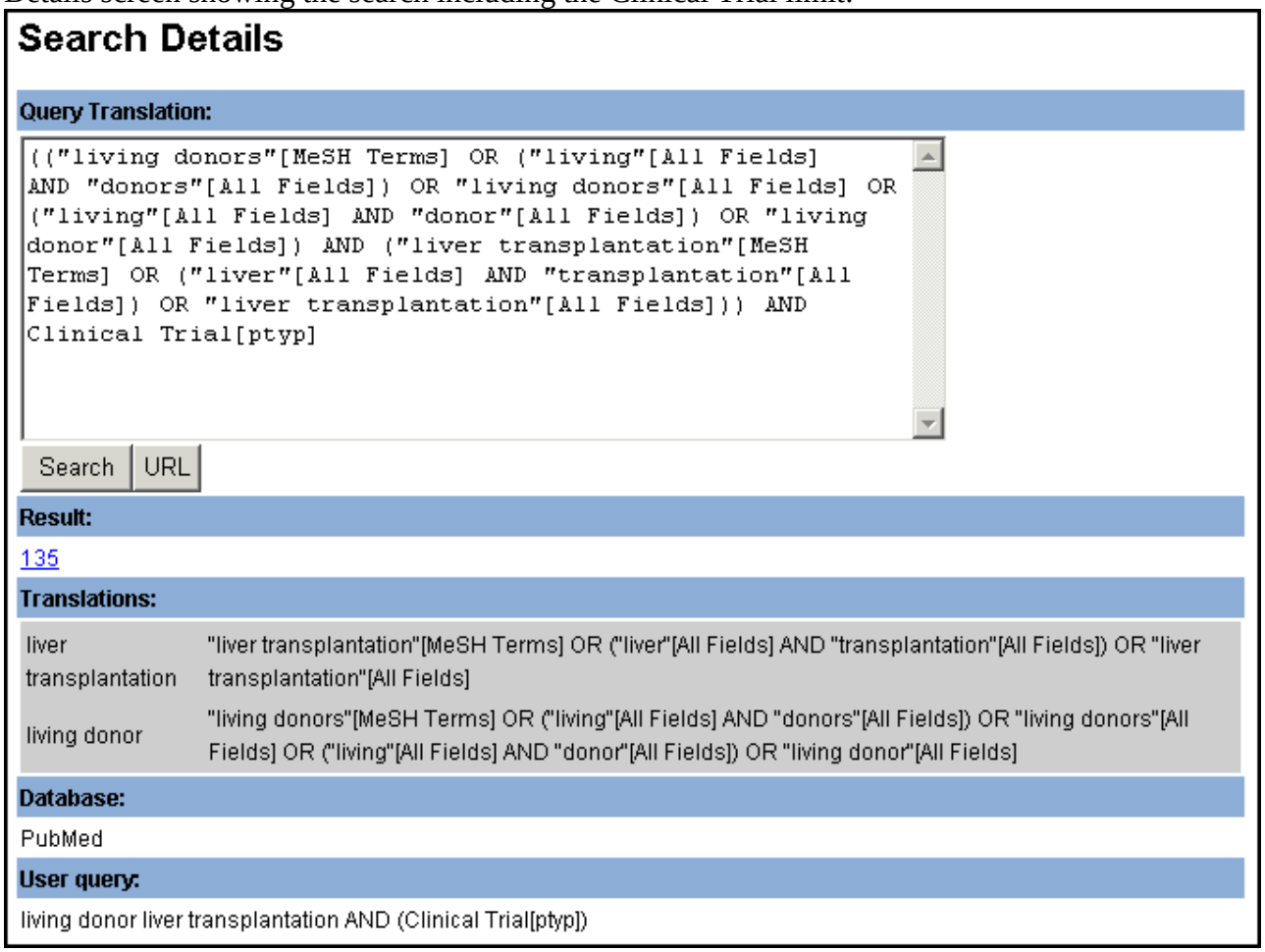
3. Find references about tuberculosis from the AIDS literature available in free full text.

Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

Suggested Answers: Limits and Phrase Searching

1. Using only the search box, find some information about using a living donor for a liver transplantation. Using the Limits area in the Advanced Search screen, further restrict the search to the publication type (Type of Article), Clinical Trial.

Details screen showing the search including the Clinical Trial limit:



Search Details

Query Translation:

```
(("living donors"[MeSH Terms] OR ("living"[All Fields]
AND "donors"[All Fields]) OR "living donors"[All Fields] OR
("living"[All Fields] AND "donor"[All Fields]) OR "living
donor"[All Fields]) AND ("liver transplantation"[MeSH
Terms] OR ("liver"[All Fields] AND "transplantation"[All
Fields]) OR "liver transplantation"[All Fields])) AND
Clinical Trial[ptyp]
```

Search URL

Result:

135

Translations:

liver transplantation	"liver transplantation"[MeSH Terms] OR ("liver"[All Fields] AND "transplantation"[All Fields]) OR "liver transplantation"[All Fields]
living donor	"living donors"[MeSH Terms] OR ("living"[All Fields] AND "donors"[All Fields]) OR "living donors"[All Fields] OR ("living"[All Fields] AND "donor"[All Fields]) OR "living donor"[All Fields]

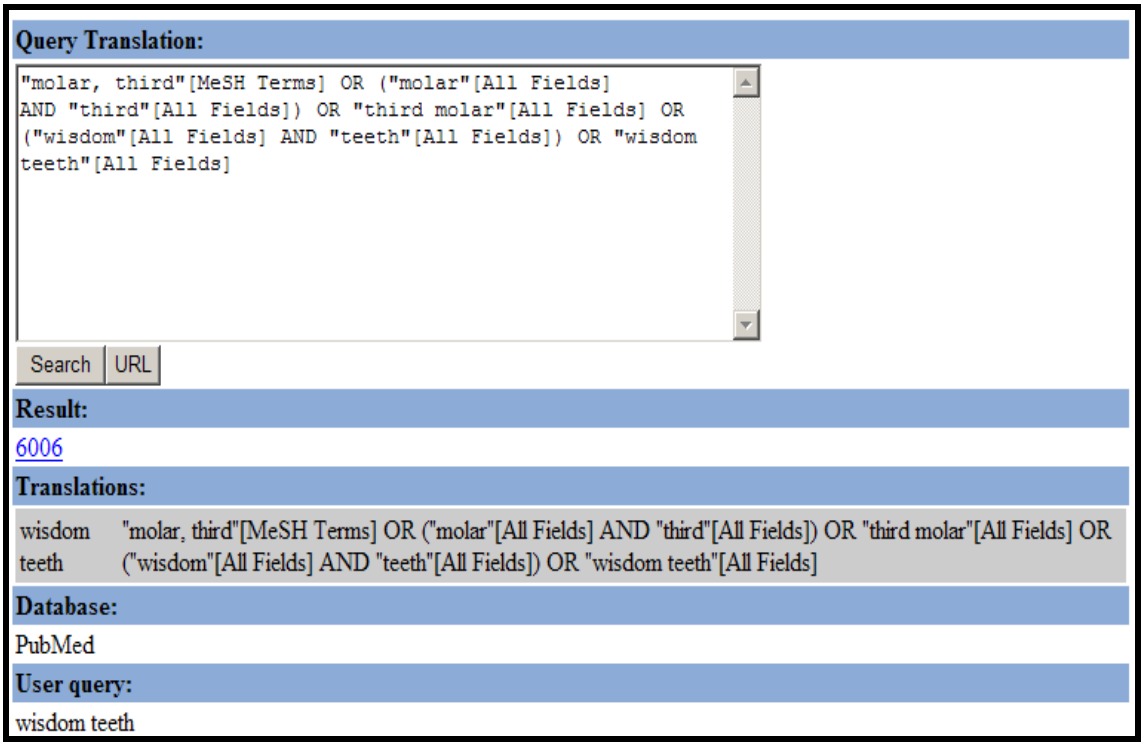
Database:

PubMed

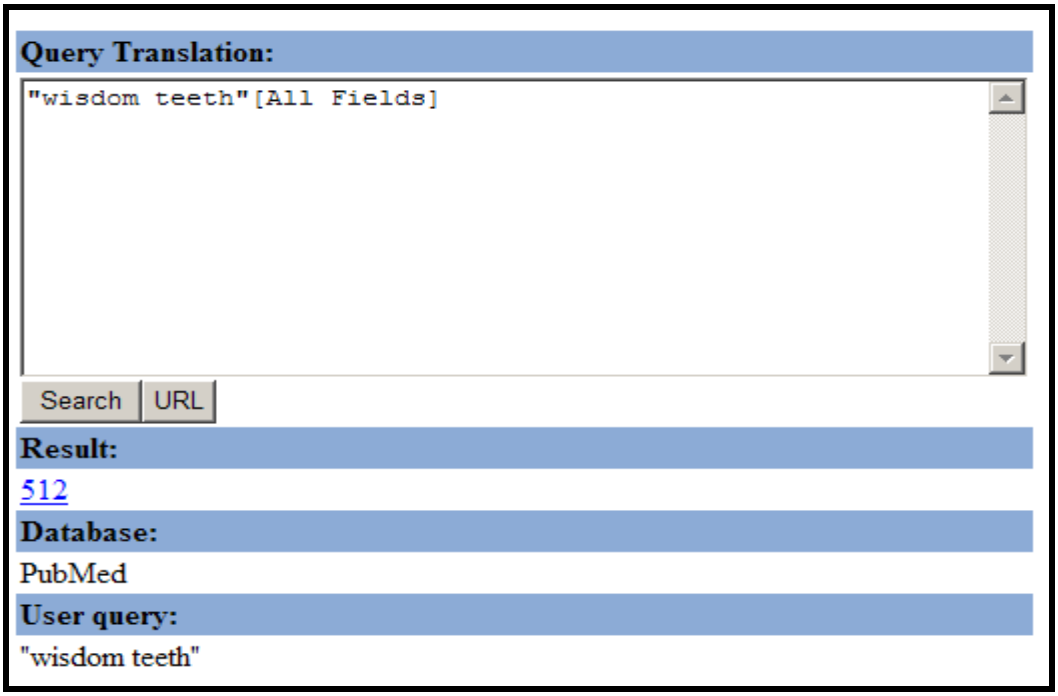
User query:

living donor liver transplantation AND (Clinical Trial[ptyp])

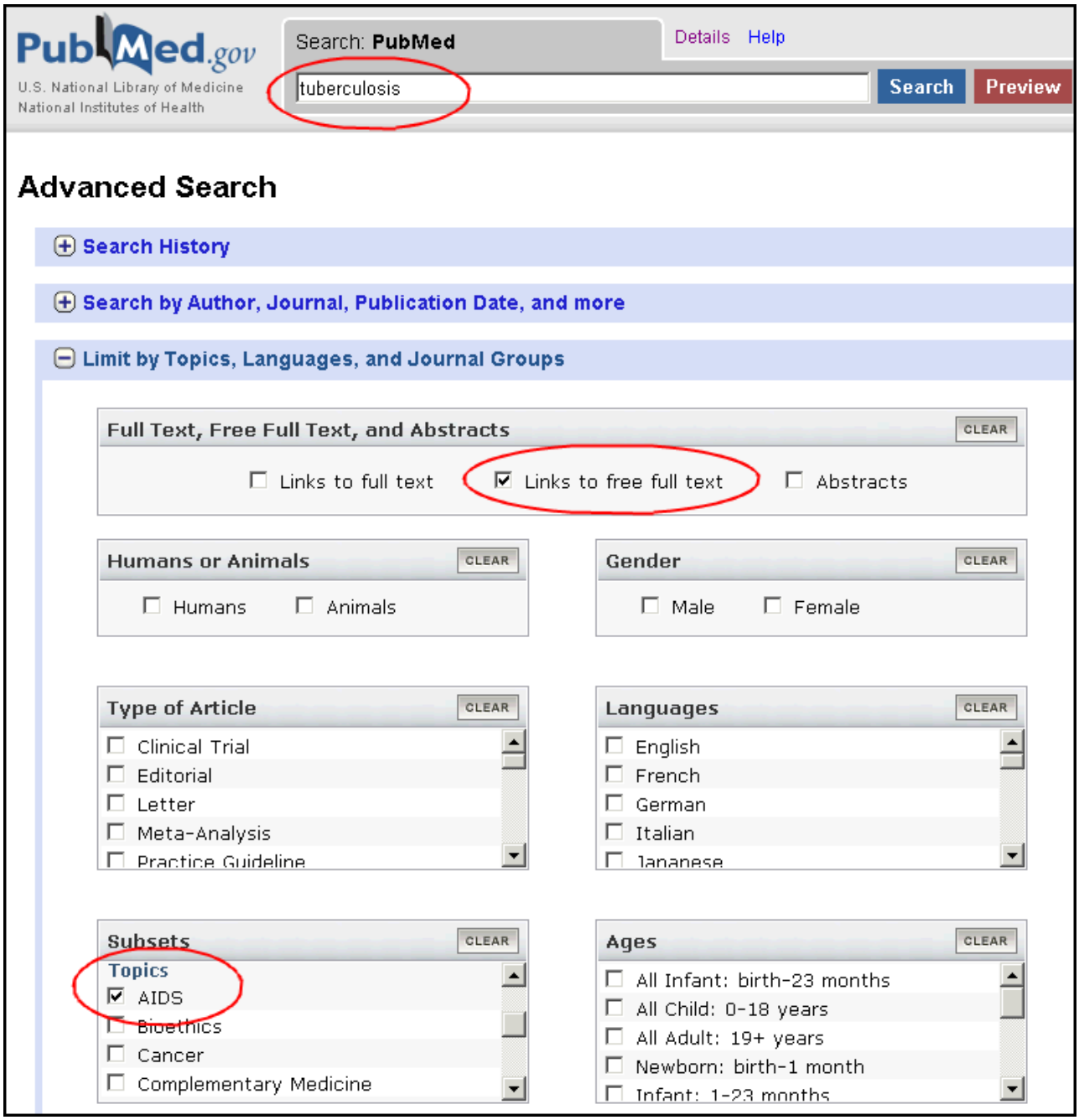
2. Compare the searches “wisdom teeth” and wisdom teeth (with and without quotes), using the Details link on the Advanced Search screen. What accounts for the difference?



Using quotes bypasses ATM and misses many records which were indexed with the MeSH term, Molar, Third:



3. Find references about tuberculosis from the AIDS literature available in free full text.



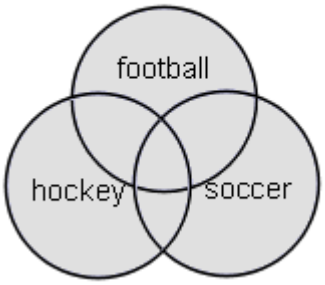
Boolean Logical Operators

In the context of database searching, Boolean logic refers to the logical relationships among search terms.

- The Boolean operators AND, OR, NOT can be used to combine search terms in PubMed. They must be entered in uppercase letters.

Logical Operator **OR**:

- Used to retrieve a set in which each citation contains *at least one* of the search terms.
- Use OR when you want to pull together articles on similar topics.



Example: *football OR hockey OR soccer*

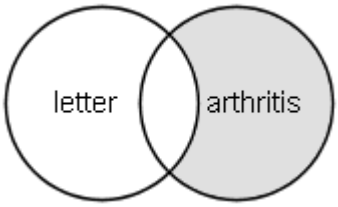
Each circle in the diagram to the right represents the retrieval for each term. The grey areas represent the retrieval for this example – all records that include any one of these terms.

The table below represents sample results for each term, then for the terms combined with OR.

Search terms	Results
football	3948
hockey	1466
soccer	3137
football OR hockey OR soccer	7538

Logical Operator **NOT:**

- Retrieves a set from which citations to articles containing specified search terms following the NOT operator are eliminated.
- Use the NOT operator with caution; you might eliminate relevant articles.



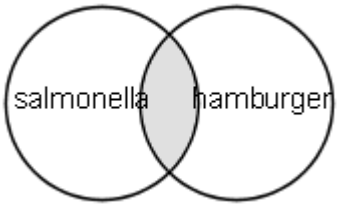
Example: *arthritis NOT letter*

Note in the diagram to the right and in the sample search results below that the retrieval is a portion of the total retrieval for arthritis – that portion not including the term letter.

Search terms	Results
arthritis	185375
letter	686049
arthritis NOT letter	176352

Logical Operator **AND:**

- Used to retrieve a set in which each citation contains *all* search terms.



Example: *salmonella AND hamburger*

Note in the diagram to the right and in the sample search results below that the retrieval is only the overlap of the results for each term – those records in which both terms appear.

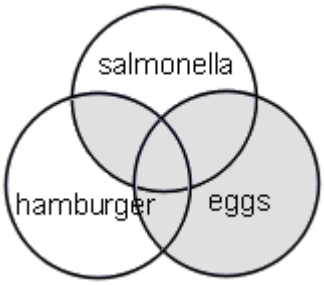
Search terms	Results
salmonella	69432
hamburger	2703
salmonella AND hamburger	14

- AND is the default operator used in PubMed. If you do not include Boolean operators in your search, PubMed will automatically use AND between terms.

Example: *diabetes mellitus phototherapy*
PubMed searches as: *diabetes mellitus AND phototherapy*

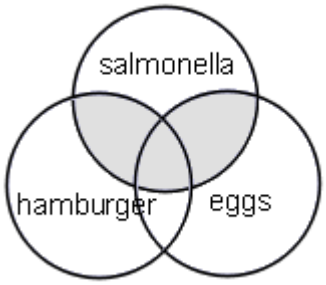
Nesting

- When using multiple Boolean operators in PubMed, they are processed left to right.



Example: *salmonella AND hamburger OR eggs*
This will retrieve records that include both terms *salmonella* AND *hamburger* as well as all records with the term *eggs*, whether or not they contain the other two terms.

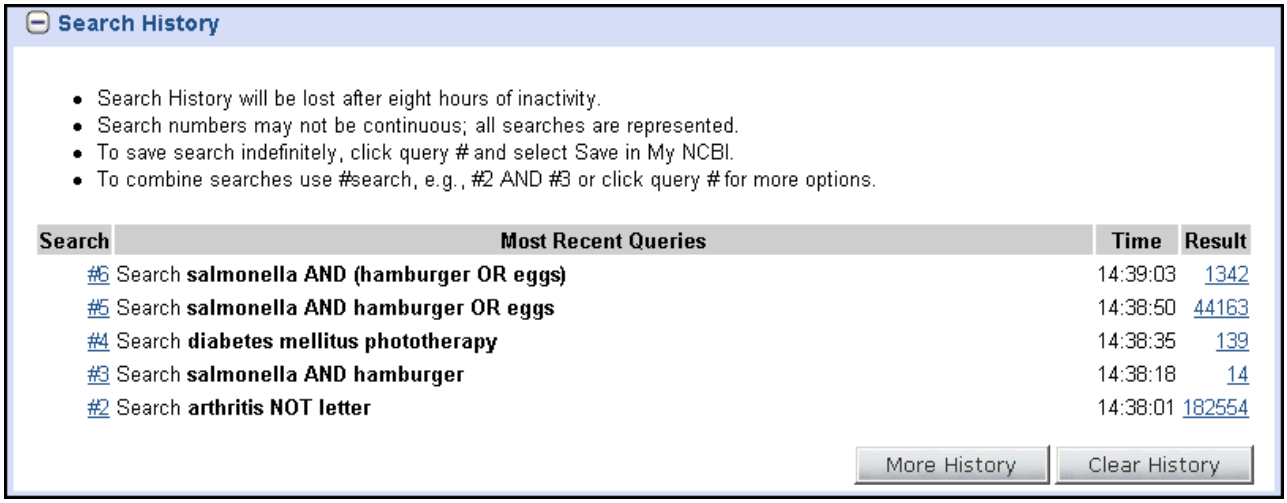
- To change the order in which terms are processed, enclose the terms(s) in parentheses. The terms inside the set of parentheses will be processed as a unit and then incorporated into the overall strategy. **This is called nesting.**



Example: *salmonella AND (hamburger OR eggs)*
This will retrieve records that contain the term *salmonella*, as well as one or both of the terms *hamburger* OR *eggs*.

History

- History available from the Advanced Search screen.
- Temporarily holds up to 100 searches and links to results.
- The History screen displays:
    - Your search query
    - Most recent 5 searches are displayed
    - The time of the search
    - The number of citations in your search results
    - Search statement numbers menu for combining searches



Using History

- You can use the search statement numbers shown in History in search strategies.

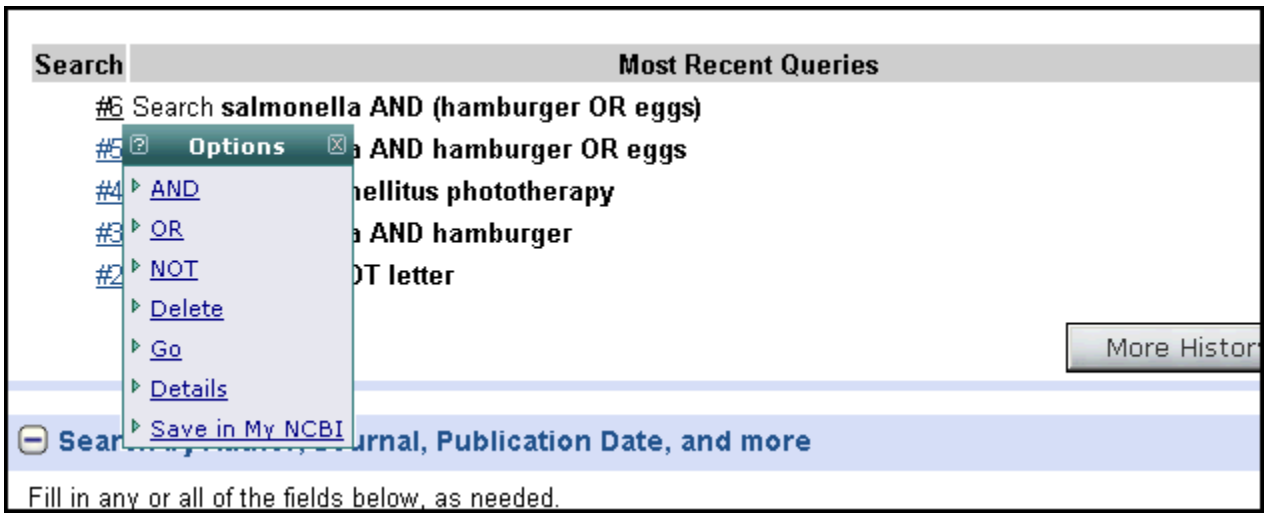
Example:

Type Boolean operators in all caps as shown in the example above.

Other examples: *#8 AND #10*
#7 OR #14

Search Statement Number Menu

- Click on the search statement number to open an Options menu:



Options Menu includes:

- Boolean operators AND, OR or NOT to add the search to the search box
- Delete the individual search from History
- Re-run the search using the Go option
- Display the search details
- Save in My NCBI

History Tips:

- Maximum number of searches that can be held in History is **100**.
- The search history will be **deleted after 8 hours of inactivity**.
- If a search is repeated, its original number is moved to the top.
- A separate Search History will be kept for each of the Entrez databases although the search statement numbers will be assigned sequentially for all databases.

History displays the last five searches. When there are more than five, click the **More History** button to see the full display. Click **Less History** to revert to the shorter display.

Click on the **Clear History** button available at the bottom of the History screen to remove all searches from the History.

Practice Exercises: Boolean Operators and History

1. In one search, find references about the relationships between circadian rhythms and either cortisol or melatonin in humans.

2. Find references about heart surgery (notice how the term is mapped using Details). Using History, combine this search with the previous search to find references about heart surgery, circadian rhythms and cortisol or melatonin in humans.

Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

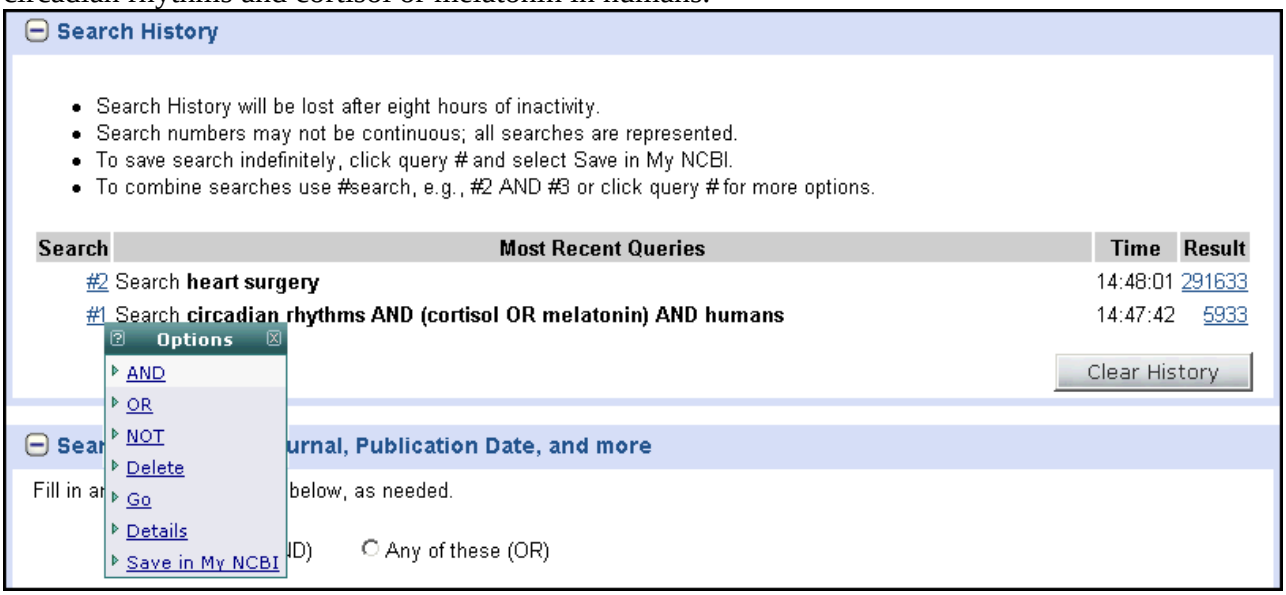
Suggested Answers: Boolean Operators and History

1. In one search, find references about the relationships between circadian rhythms and either cortisol or melatonin in humans.

   circadian rhythms AND (cortisol OR melatonin) AND humans

   [You may also use the Humans checkbox from the Limits area on the Advanced Search screen. These terms can be in any order but the OR phrase must be in parentheses.]

2. Find references about heart surgery (notice how the term is mapped using Details). Using History, combine this search with the previous search to find references about heart surgery, circadian rhythms and cortisol or melatonin in humans.



   After running a search for heart surgery, go to History area of the Advanced Search screen, click on the search number link for your circadian rhythm search and select AND. Click the **Search** button.

   OR

   Combine the two searches by typing in the search box:
   #1 AND #2
   (substituting the numbers of the appropriate searches).

Searching with MeSH and the MeSH Database

MeSH Database

The MeSH Database allows you to:

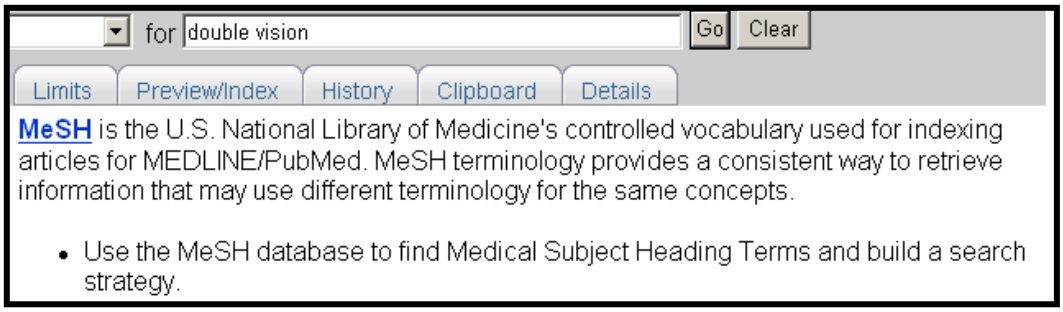
- Locate and select MeSH terms (Headings, Subheadings, & Publication Types); Supplementary Concept terms (Substance Names) and Pharmacological Action terms.
- See the definition and other helpful information for a MeSH term.
- Build a PubMed search strategy.
- Display MeSH terms in the hierarchy.
- Limit MeSH terms to a major concept for a search.
- Attach subheadings for a search.
- Link to the NLM MeSH Section's MeSH Browser.

How to Get There

- Click MeSH link at the bottom of the Advanced Search screen; Click on **MeSH Database** under More Resources on the PubMed home page; or use the database selection menu on the search bar.

Let's use the MeSH Database to find the proper **MeSH term** for condition of *double vision* and then search PubMed for relevant citations.

*Enter the term, **double vision**, in the search box and click the **Go** button.*



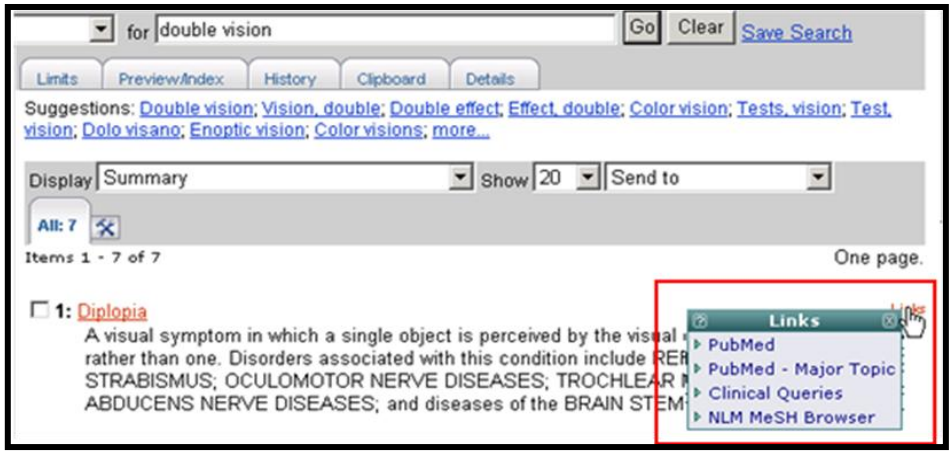
Summary format:

- Select PubMed from the Links pull-down menu to run a PubMed search with that term.

***Suggestions** are MeSH or Entry terms generated by an algorithm that compares letter combinations.*

***Scope Note** (meaning for this concept is displayed.)*

***Links** allows you to use the term in a PubMed search, use it as a major topic, link to the MeSH Section MeSH Browser or Clinical Queries.*

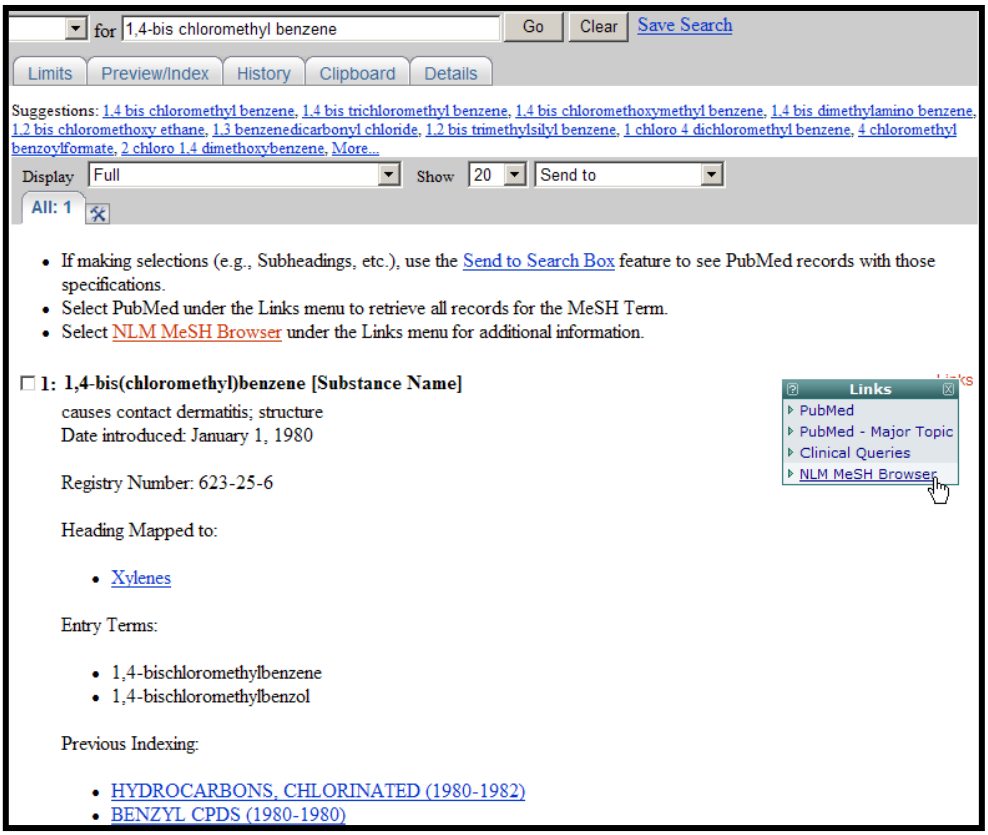


Let's search for the supplementary concept term: **1,4-bis(chloromethyl)benzene**

Some substance names are long and "complicated." Please note also that when searching any Entrez database for a term with parentheses, e.g., 1,4-bis(chloromethyl)benzene, do *not* enter the parentheses.

These terms will display in search retrieval with the label ***[Substance Name]****.*

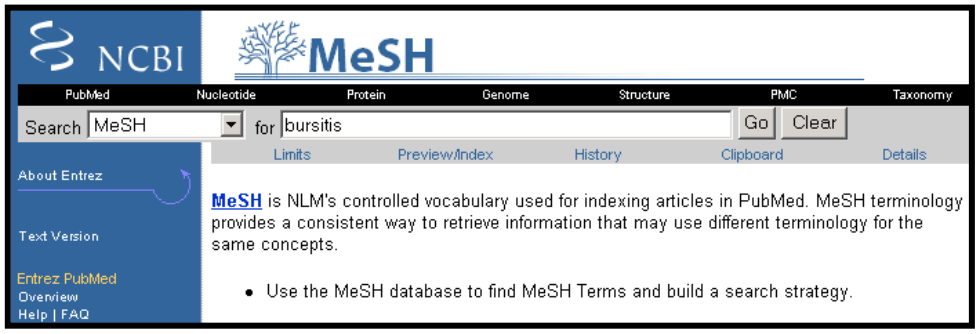
To see additional information for any term, use the link to the ***NLM MeSH Browser*** *from the* ***Links*** *menu*



The Feature tabs (Limits, History, etc.) from the MeSH Database deal specifically with the MeSH Database not the PubMed database.

Now, let's use the MeSH Database to build a search strategy for a search for citations about the *diagnosis of bursitis* which requires the use of a subheading.

*Enter the term, **bursitis**, in the search box and click the **Go** button.*



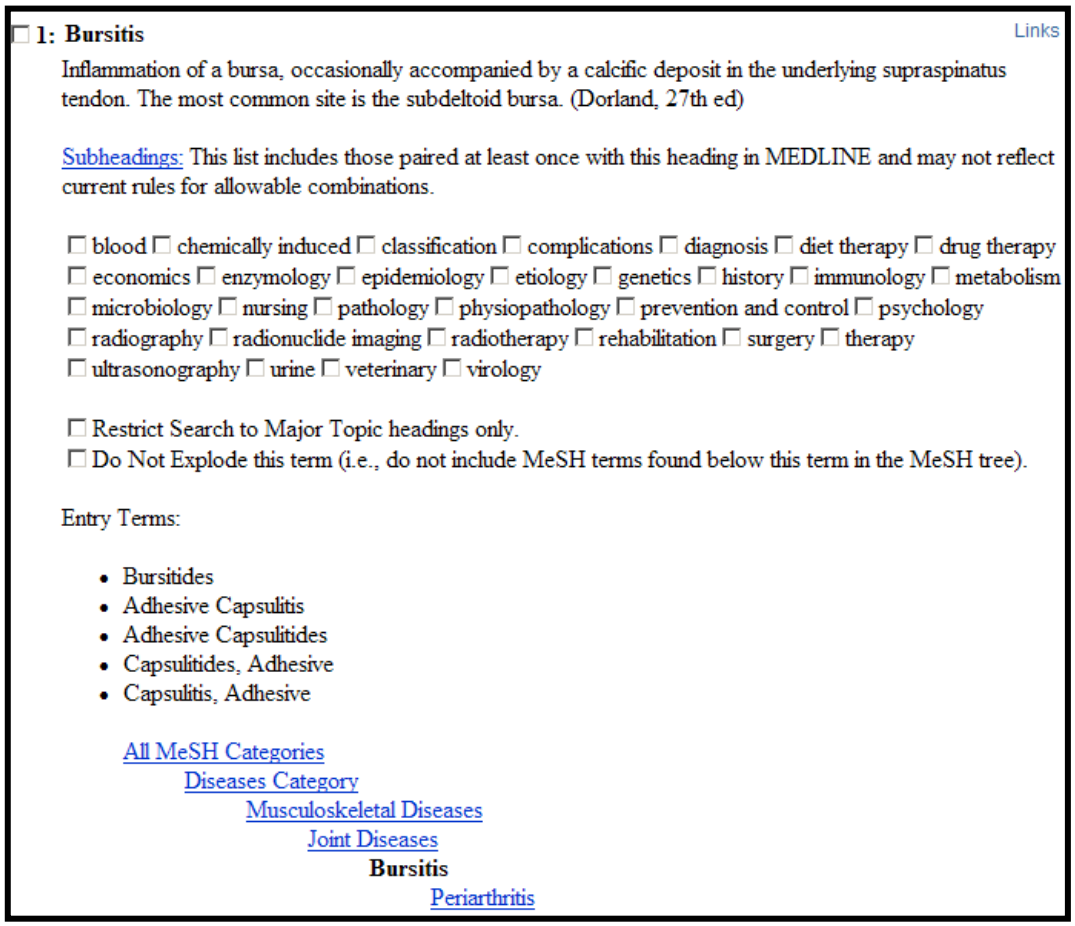
The single record retrieved is displayed in the Full format:

*Use the check boxes to select subheadings. Click on the **Subheadings** link to see a list of subheading definitions.*

Use these checkboxes to restrict to major topic or to not explode a term.

Entry Terms (synonyms) are provided.

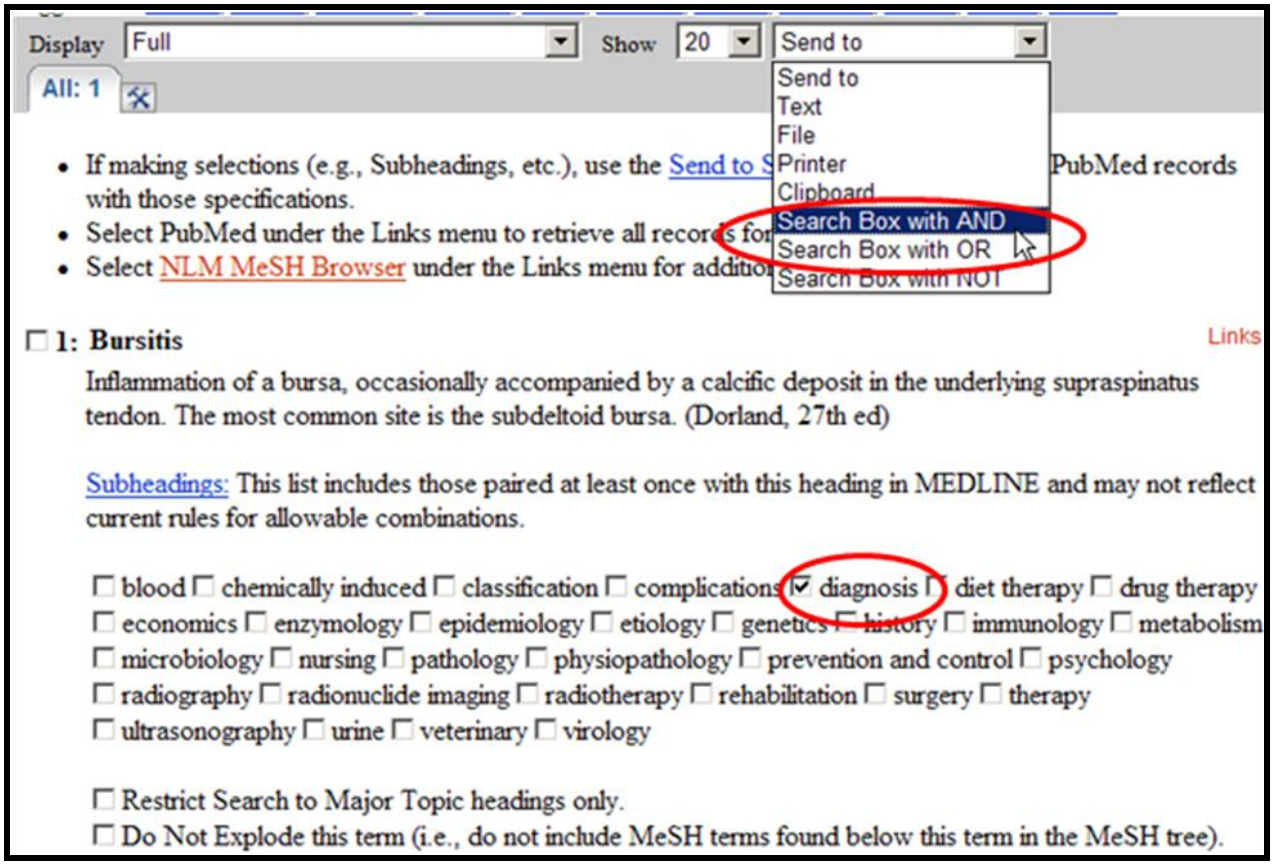
MeSH hierarchy is displayed with searched term in boldface.



Send to Search Box

To specify a search for: *Citations about the **diagnosis** of bursitis*

1. Select the diagnosis subheading from the Full display screen.
2. Select Search Box with AND from the **Send to** pull-down menu.



The term with any specifications will appear in the Search Box:

To add additional terms to this strategy, continue searching the database and add terms to the Search Box using the Send to Search Box feature.

Now, let's adjust our search to specifically look for articles discussing the ***diagnosis of bursitis in the knee joint***. Restrict to citations where the **major focus of the article is knee joints** and then add this term to the strategy we are building:

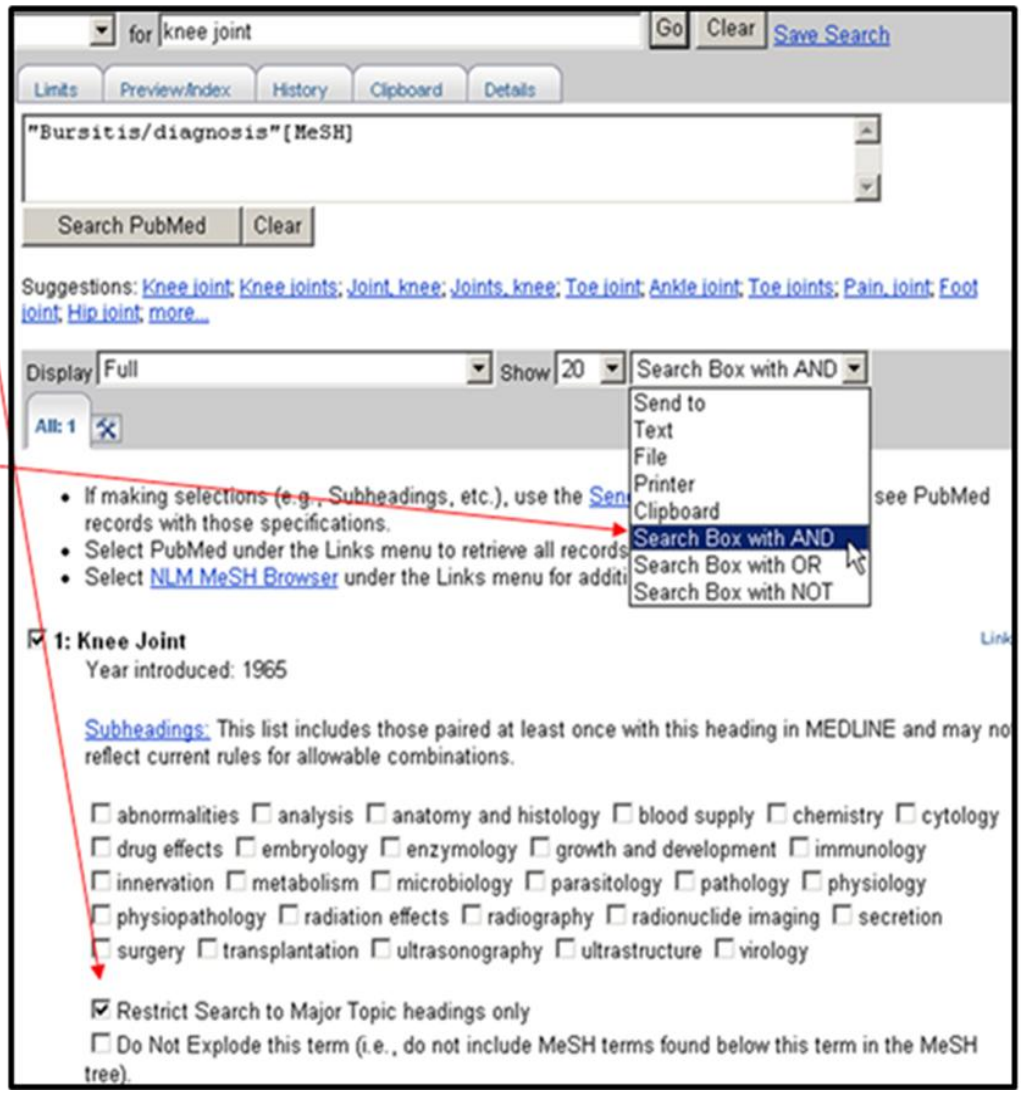
*Searching on the next term. Click **Go**.*

Here's the strategy being built.

*This brings you to the Full display for **Knee Joint**.*

*1. Click in the check box for: **Restrict Search to Major Topic headings only**.*

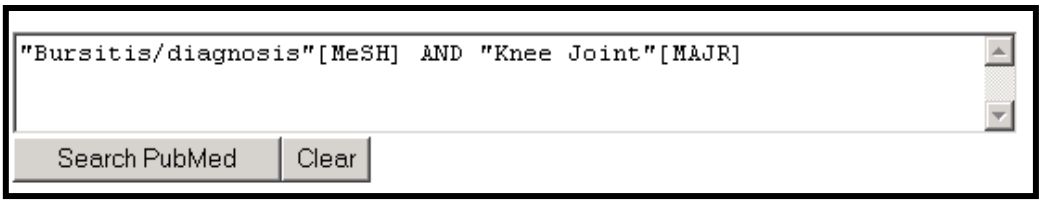
*2. Select **Search Box with AND** from the **Send to** pull-down menu.*



Now, the search is built and is ready

to be run in PubMed. Click the Search PubMed button below the Search box:

*Click **Search PubMed** button.*



Practice Exercises: Searching with MeSH

Try using the MeSH database to build your searches that require the use of MeSH headings.

1. Find articles discussing prostate cancer as the main focus of the article. Use the MeSH Database to begin your search. Restrict to studies involving treatment by leuprolide.

2. Find references discussing the economics of community-acquired pneumonia.

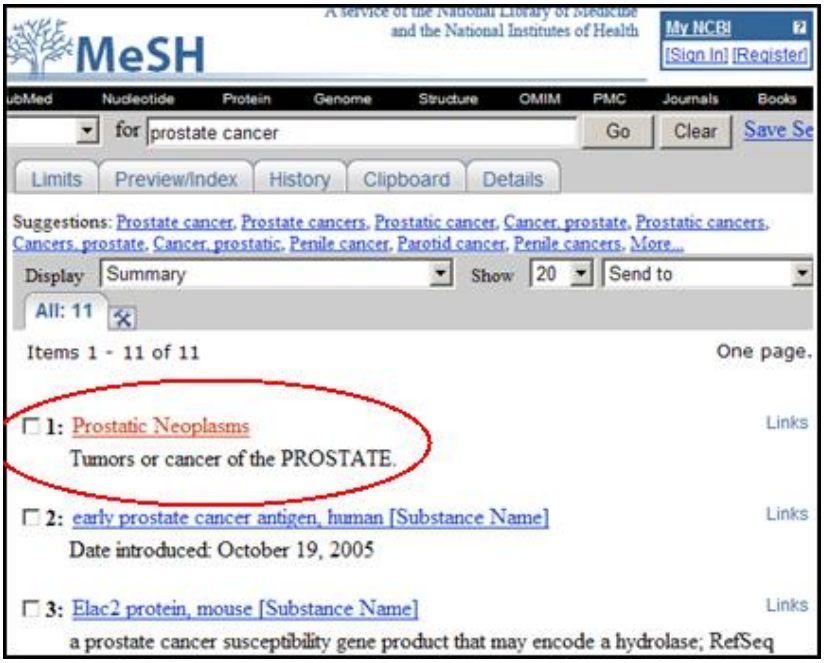
Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

Suggested Answers: Searching with MeSH

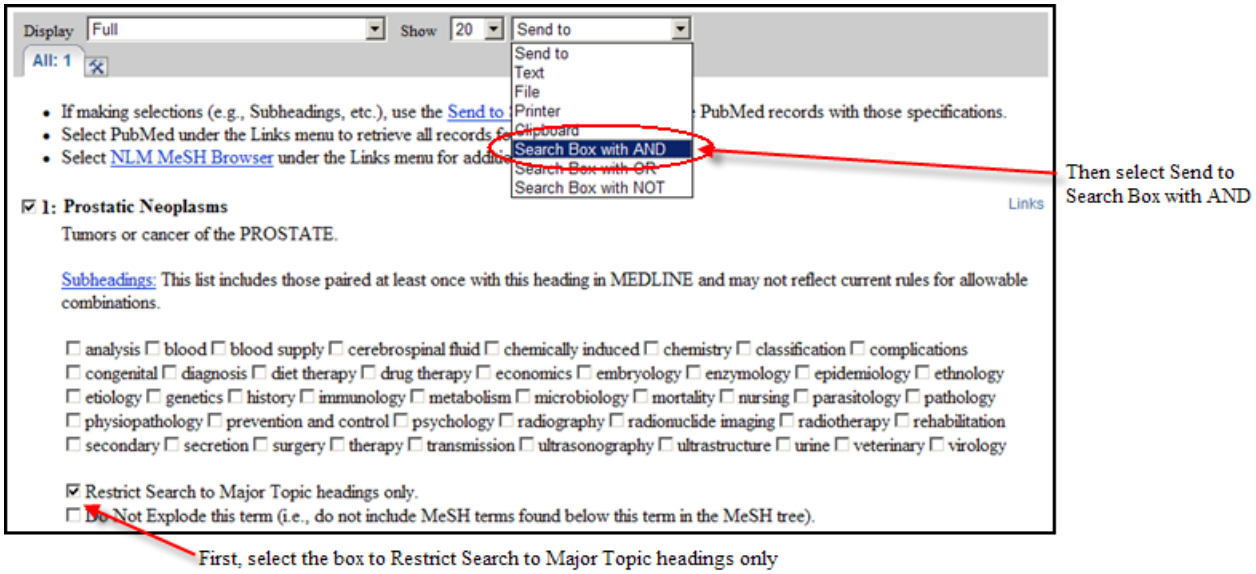
1. Find articles discussing prostate cancer as the main focus of the article. Use the MeSH Database to begin your search. Restrict to studies involving treatment by leuprolide.

Search prostate cancer in the MeSH Database.

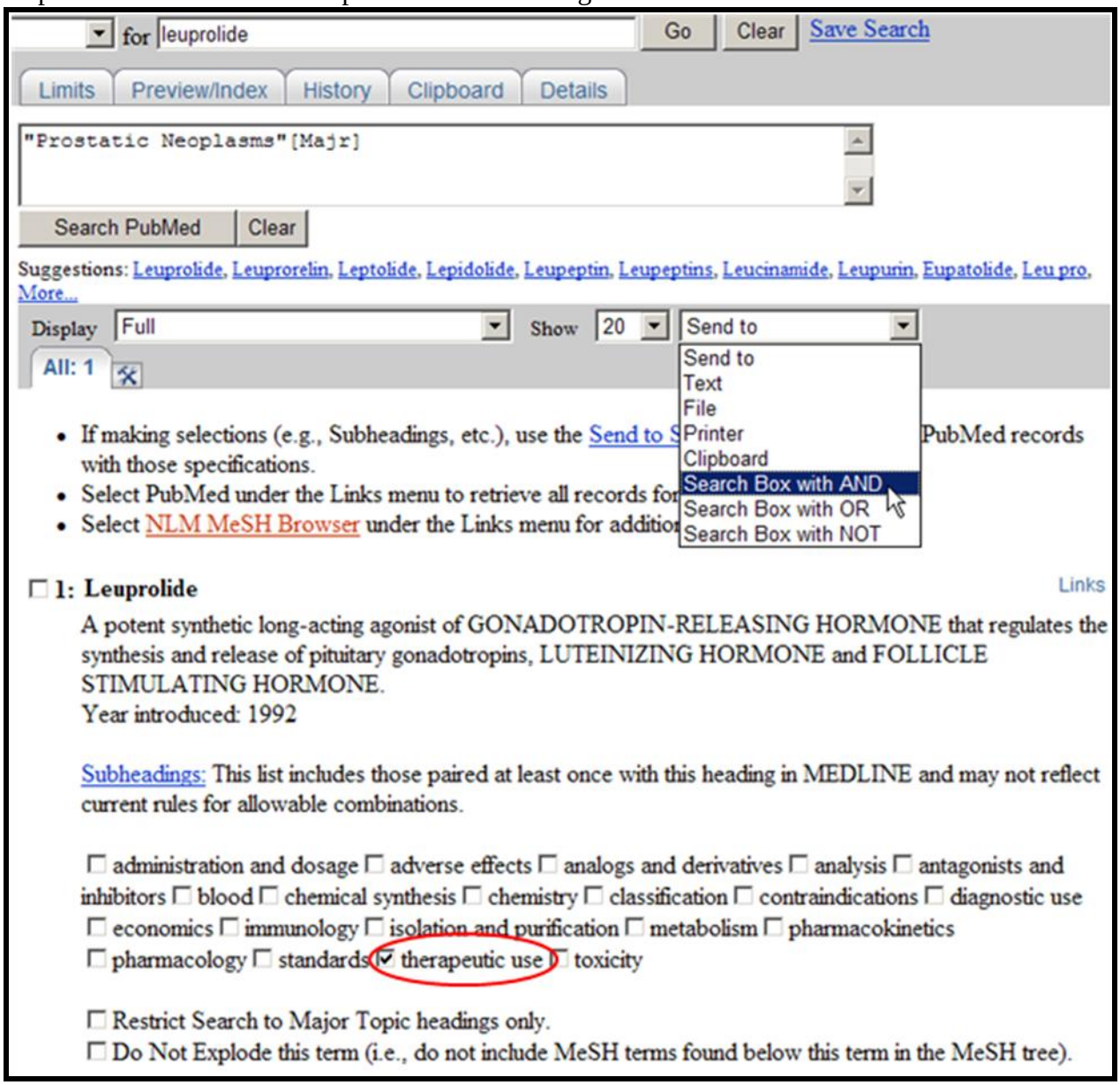
Click term to reach Full display.



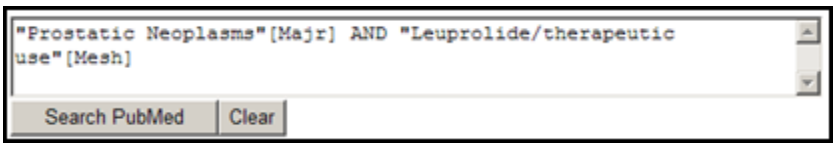
Restrict to Major Topic and add the term to your search:



With "Prostatic Neoplasms"[Majr] in the MeSH Database Search Box, find the record for leuprolide and select the therapeutic use subheading. Send to Search Box with AND.

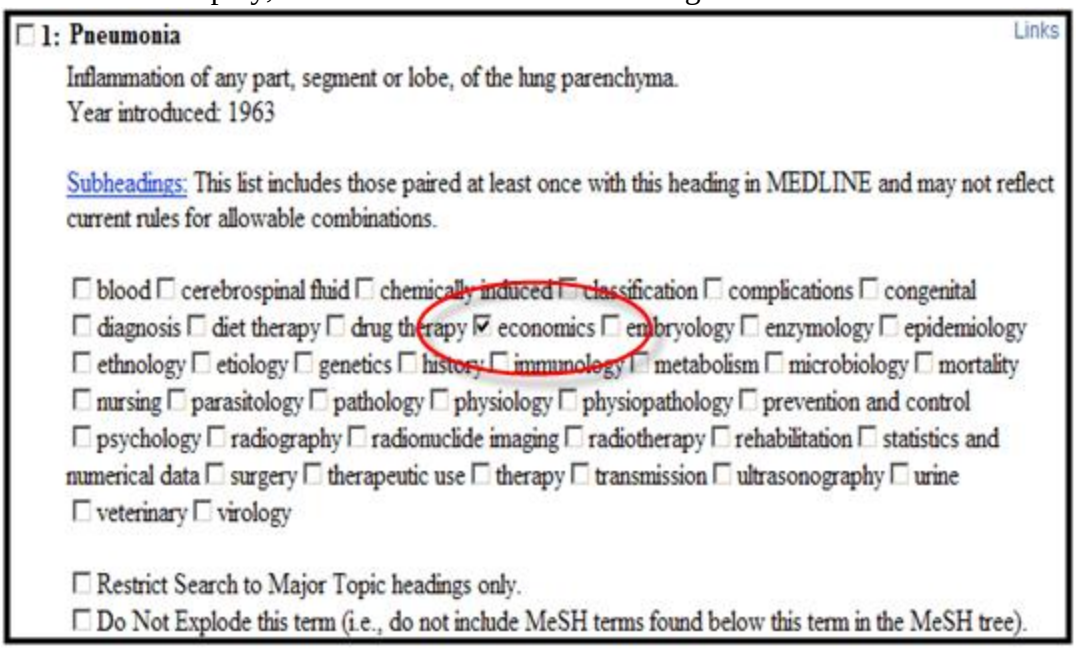


Once satisfied with the search strategy, click Search PubMed:



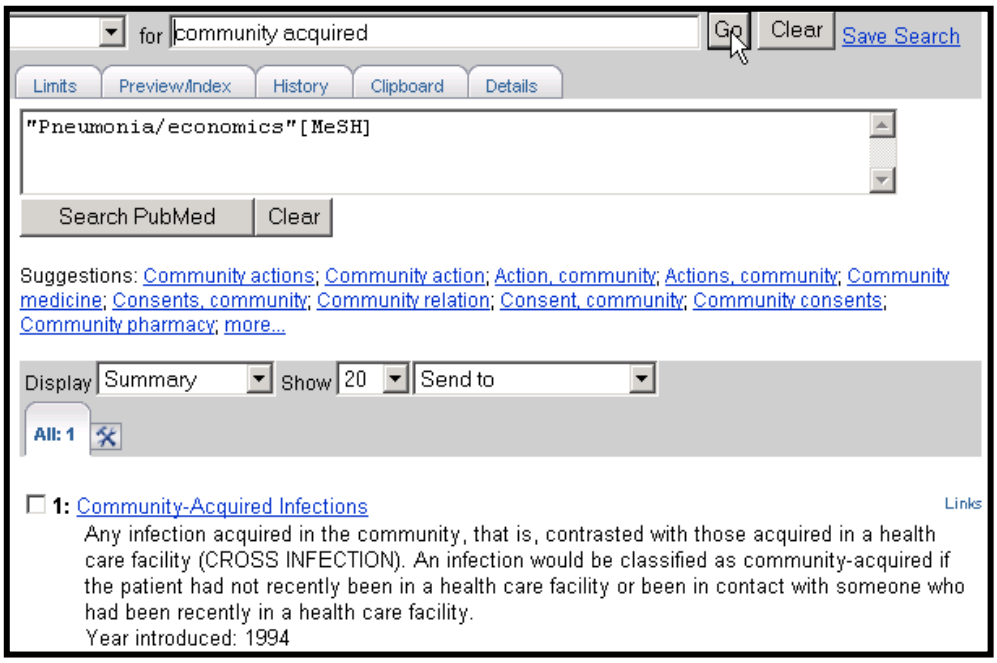
2. Find references discussing the economics of community-acquired pneumonia.

Search pneumonia in the MeSH Database.
From the full display, select the economics subheading.

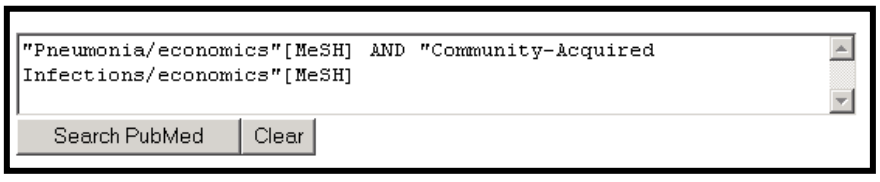


Search for the next term: community acquired.

Read the Scope Note. If relevant, click on the term to see the Full Display for more information including subheadings.



Send the final strategy to PubMed:



Search by Field

There are several ways to search using a specific field (e.g., author, title, journal name).

Search by Author, Journal, Publication Date, and More via the Advanced Search screen

- Use to search for terms within selected fields
- Default set up for Author, Journal, and Publication date searching
- Use the pull-down menus to change the search fields
- Auto-complete feature available for Author, First Author, Last Author, and Journal
- Use the radio buttons to choose AND or OR operator
- Click on the Index button to the right of each line to display the index of searchable terms for the selected search field

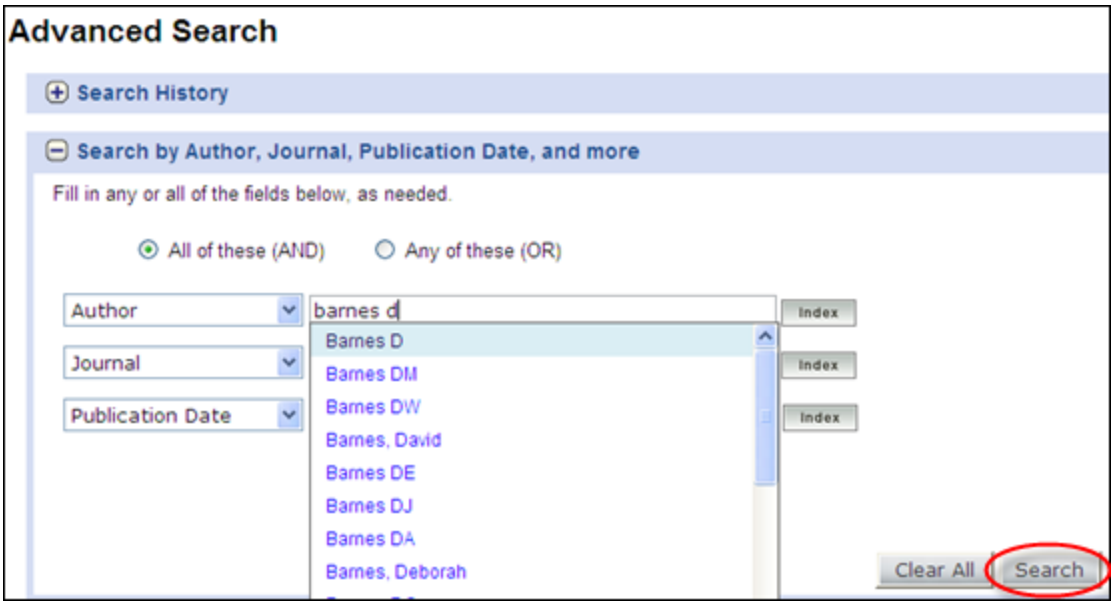
Author Search Example:

Type in last name of author.

Notice auto-complete feature.

Select name.

Click Search button.



Journal Search Example:

Type in journal name.

Notice auto-complete feature.

Select journal.

Click Search button.

Using the Index feature

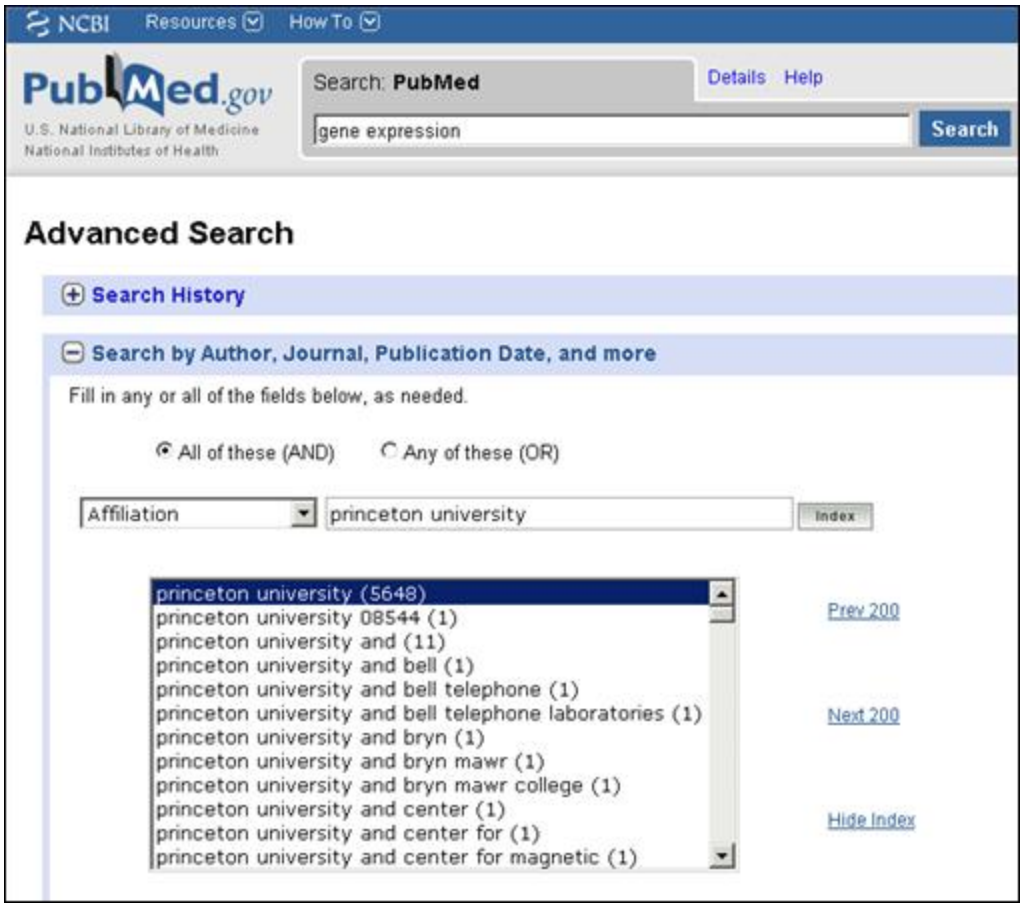
- There are several ways to search specific fields of MEDLINE/PubMed records, including using the field indexes and search tags.

Viewing and selecting terms from the Index to develop search strategies

- Use the Index button to view and select terms from the Index and to add them to your search strategy.
- The Index allows you to view a listing of searchable terms within a search field.
- You may also select terms to build a search strategy using Boolean operators.

Selecting a field and entering a term to look up in the Index

Example: *Use the Index function on the Advanced Search to find citations to articles about gene expression where the first author's affiliation is listed as Princeton University.*



Subject term entered in the Advanced Search search box.

Select affiliation from the pull-down menu.

PubMed displays a portion of the alphabetical list of available terms for the selected search field. Scroll up and down this window using the ***scroll bar****.*

The number of citations that contain the term appears in parentheses to the right of the term.

To scroll up or down the entire Index for the field, click the ***Previous*** *or* ***Next*** *links.*

Selecting a term from the Index

- Click on the term to highlight it.
- Click on the Hide Index link to close-up the Index display if desired.
- Continue viewing, selecting, and adding search terms until your strategy is complete. Then click the **Search** button either at the top of screen or in the Search area.

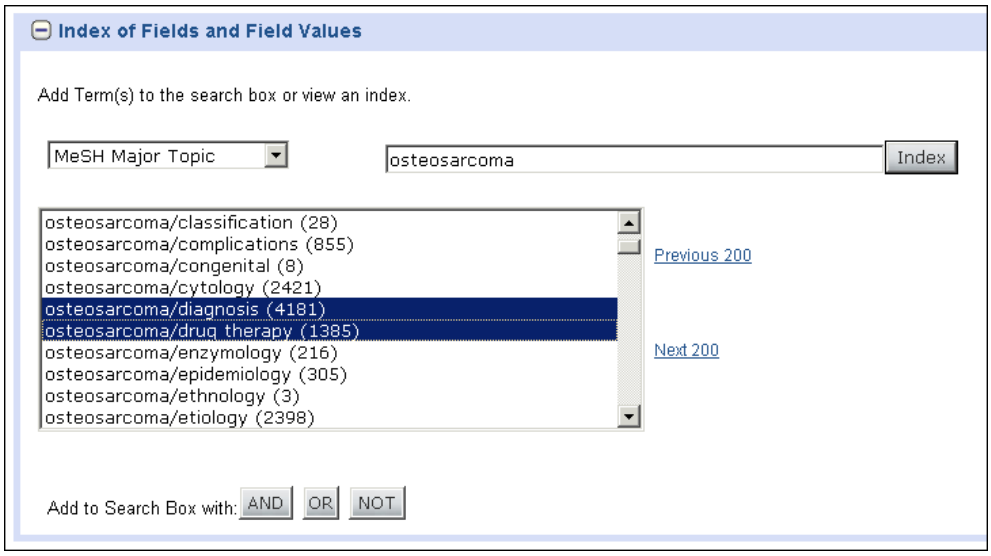
Search box *shows the search term and the search field.*

Index of Fields and Field Values area of the Advanced Search Screen

- Use this Index if you wish to choose multiple terms from an Index display to OR together

Example:

Find articles discussing the diagnosis of osteosarcoma or using chemotherapy (drug therapy) to treat osteoscarcoma. Limit to articles where aspects are the main point.

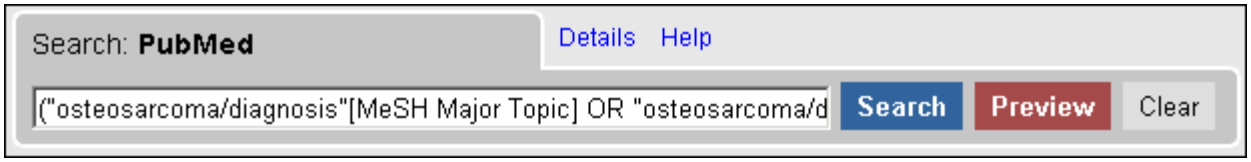


Select Search field from drop-down menu.
Type in search term(s)
Click Index button.

Use the Ctrl-key (PC) or the Command-key (Mac) to OR together multiple terms.

Click the desired Boolean connector to add terms (OR'ed together) to the query.

- In this example, click on the AND button which adds your terms to the Advanced Search top search box. Then click the Search button to run the search:



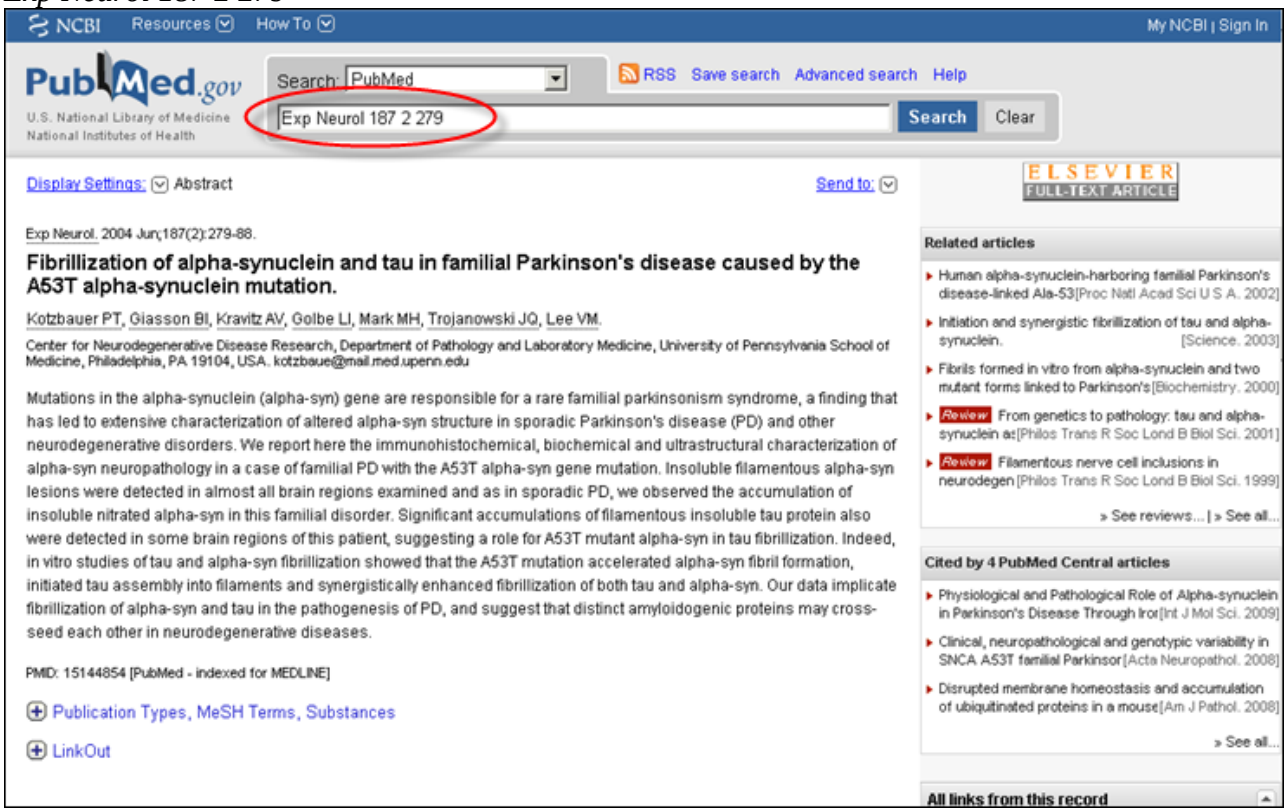
See page 84 for more on searching by fields using search field tags.

Finding a specific citation

Using the Search box

Simply type in the available information into the Search box:

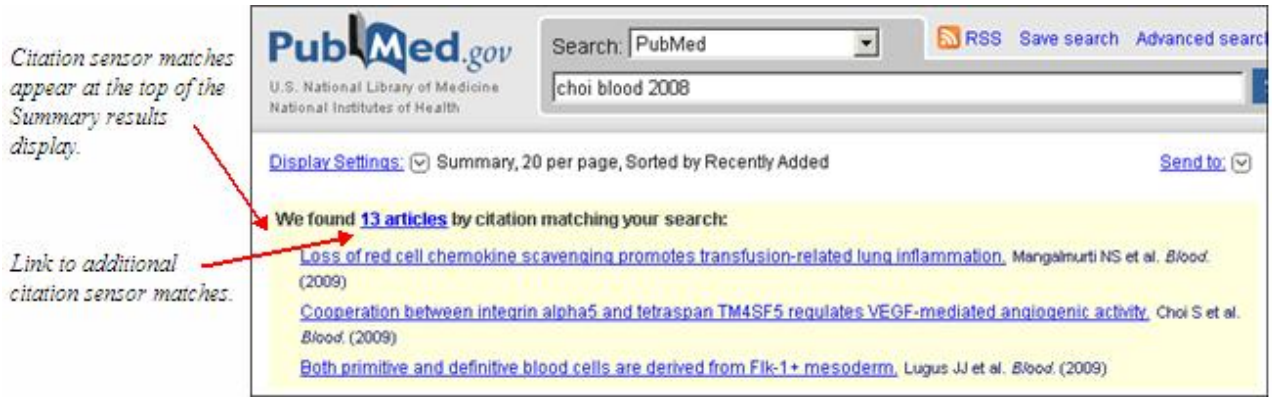
Exp Neurol 187 2 279



Citation sensor

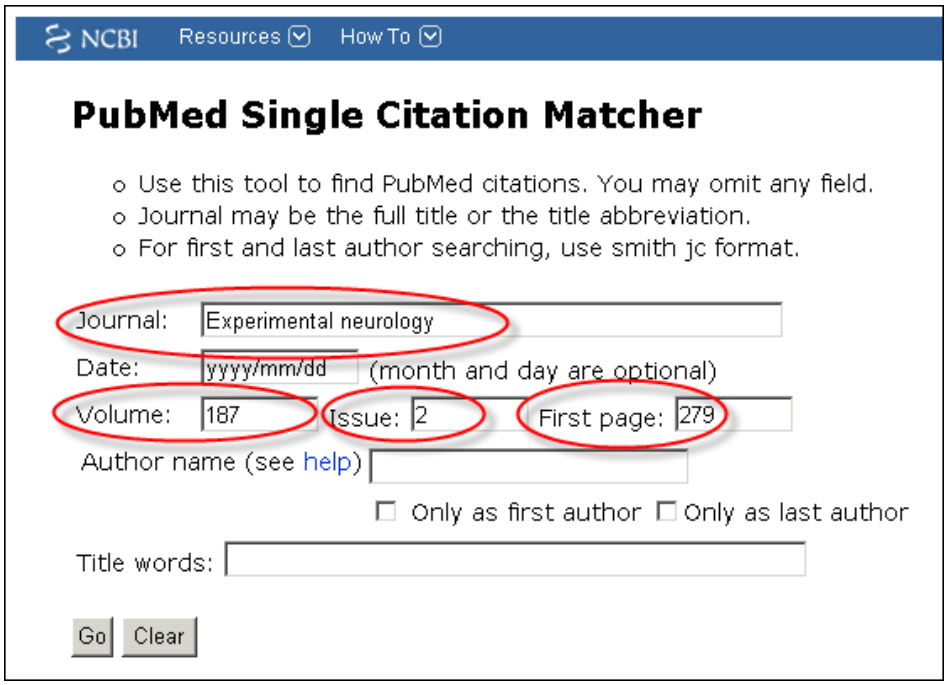
The Citation Sensor is a feature that assists searchers looking for a specific article.

- It looks for combinations of search terms that are characteristic of citation searching, e.g., volume/issue numbers, author names, journal titles, publication dates.
- Whenever possible the Citation Sensor matches the search with citations in PubMed.
- If your search invokes the Citation Sensor, you will see a yellow area above the default retrieval with links to one or more citations for your consideration:

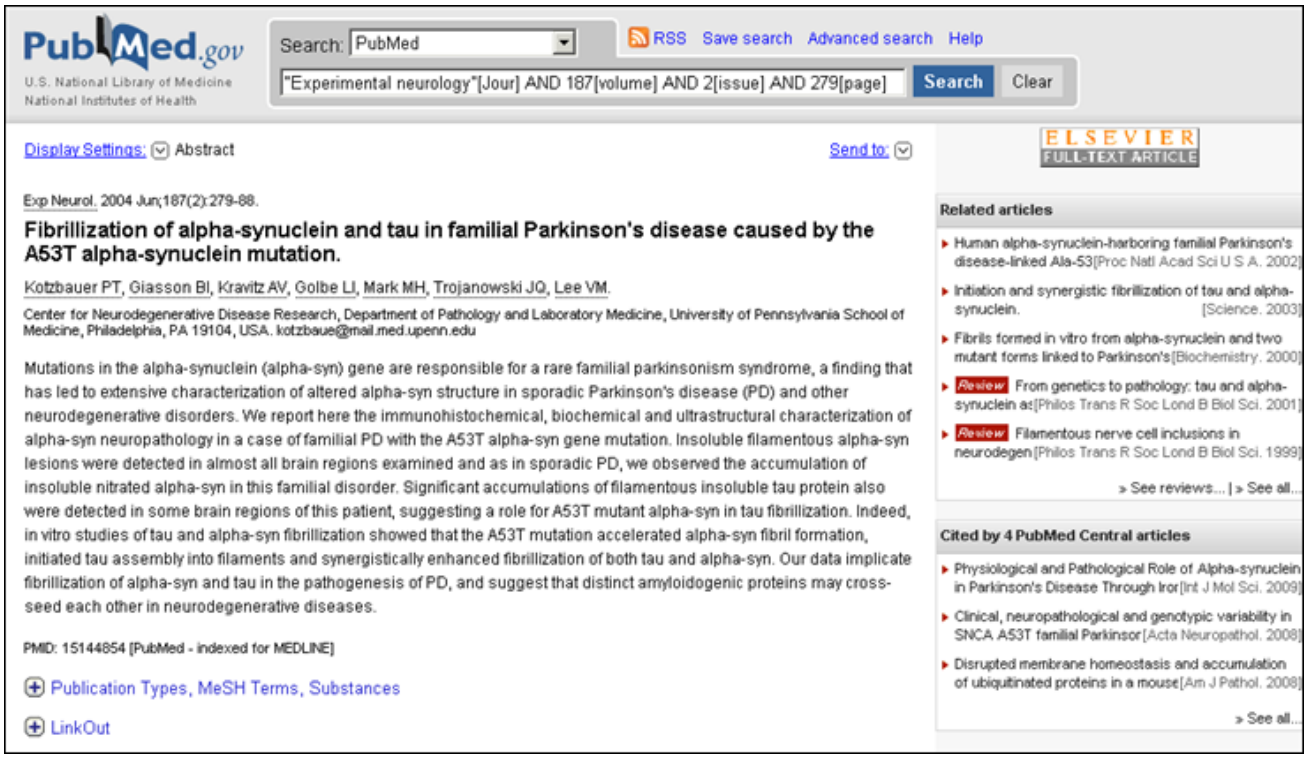


Single Citation Matcher

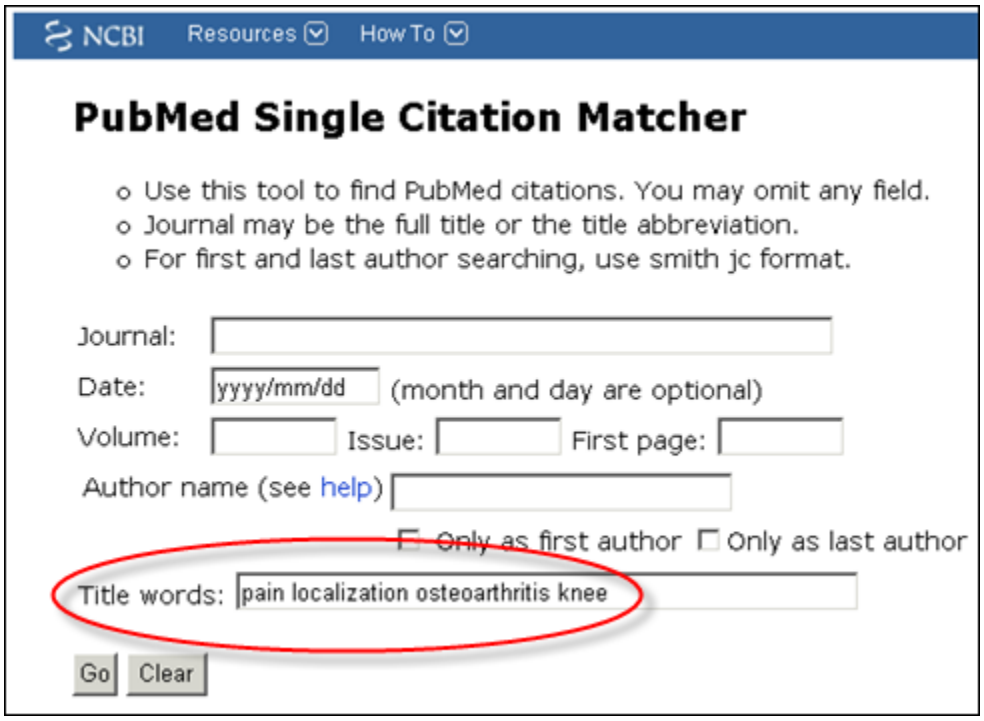
The Single Citation Matcher, available from the PubMed Home page and the Advanced Search page, allows you to fill in the information you have about a citation (e.g., author, title, journal, volume, issue, page) by field.



Autocomplete feature available for Journal and Author name



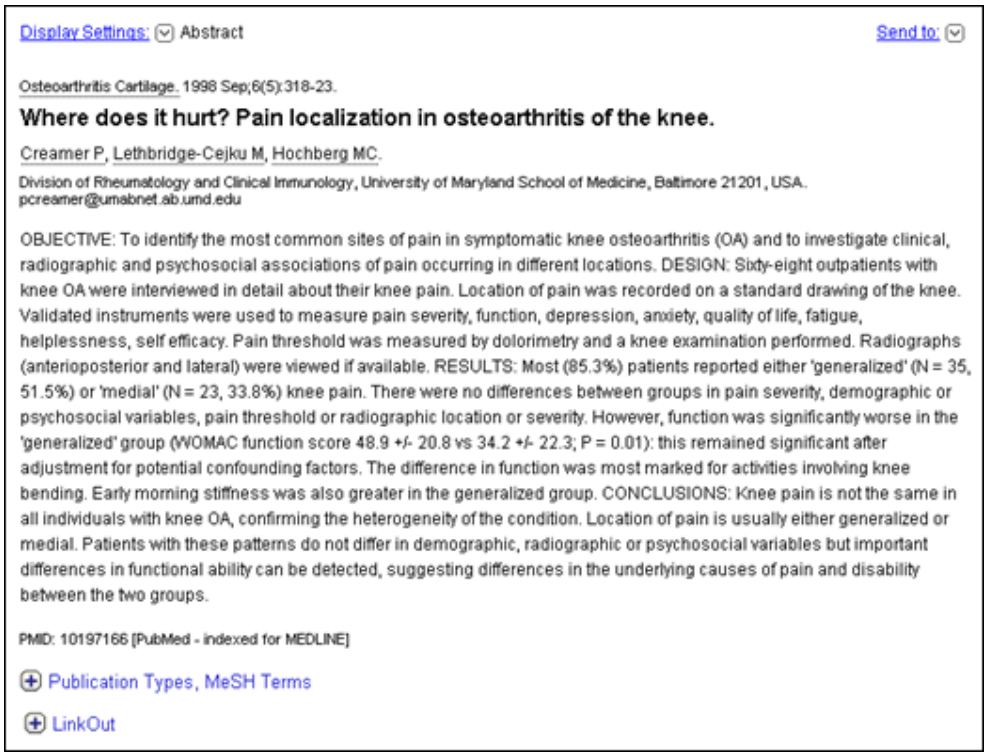
Example: *You are looking for the citation for an article entitled, "Where does it hurt? Pain localization in osteoarthritis in the knee."*



Type in significant title words.

Click the Go button.

Result:



Using Search Tags -- Search Field Descriptions

- Search fields can be specified using PubMed's search field tags. A list of the field names and searching information is found in PubMed Help: Search Field Descriptions and Tags (http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.section.pubmedhelp.Search_Field_Descrip). Not all searchable fields are included in this workbook section.

- For further information on the data found in the fields found on the MEDLINE display format, see MEDLINE®/PubMed® Data Element (Field) Descriptions (http://www.nlm.nih.gov/bsd/mms/medlineelements.html)

Rules

- Each search term should be followed with the appropriate search field tag, which indicates which field will be searched. The search field tag must follow the term.
  Correct entry: aromatherapy [mh]
  Incorrect entry: [mh] aromatherapy
- Search field tags must be enclosed in **square brackets**.
- Case and spacing do not matter: ice [mh] = Ice[mh] = ICE [MH]

Terms entered with a search tag (e.g., [mh]; [majr]; [tw]) will not generate the "Did you mean" message (PubMed's spell check feature).

MeSH headings [mh]

- MeSH headings can be searched using two search field tags:
  [mh] to search a MeSH heading
  [majr] to search a MeSH heading that is a major topic of an article

- PubMed **automatically** searches the MeSH heading as well as the more specific terms beneath that heading in the MeSH hierarchy; i.e., **the term is exploded**.

- To turn off automatic explosion of MeSH headings, use one of the following tags:
  [mh:noexp] or [majr:noexp]

Example: *thromboembolism [majr:noexp]*

Alternatively, consider using the "Do not explode" selection from the Detailed Display in the MeSH Database.

Searching with MeSH headings will exclude in process and publisher-supplied citations, as they are not indexed with MeSH.

Subheadings [sh]

- You can directly attach subheadings to MeSH headings using the format MeSH heading/subheading.

- Two letter abbreviations for subheadings or the full subheading name may be used.

Examples: *thromboembolism/pc*
thromboembolism/prevention and control
toes/in [majr]
toes/injuries [majr]

- Only one subheading may be attached to a MeSH heading at a time. To attach multiple subheadings, combine each MeSH/subheading combination with the OR connector or use the MeSH Browser.

Example: *thromboembolism/pc [majr] OR thromboembolism/di [majr]*

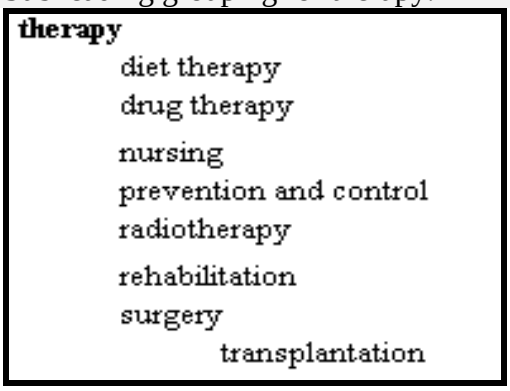
- For a MeSH/subheading combination, PubMed always explodes the MeSH term and also searches the subheading and its grouping if there is one.

In the example below, the subheading therapy or members of the therapy grouping (e.g., diet therapy) will be attached to the MeSH term (hypertension) or one of its indentions (e.g., hypertension, malignant).

Example: *hypertension/th*

Hypertension with its indentions:

Subheading grouping for therapy:



A list of subheadings and subheading groupings appears in PubMed's Help.

To **turn off both** the MeSH heading explosion and subheading groupings, you would enter:
hypertension/th [mh:noexp]
hypertension/th [majr:noexp]

These search for **only** the subheading therapy attached to **only** the MeSH term hypertension (with "majr," only as the main point).

- You may also choose to "free-float" a subheading with a MeSH heading using the Boolean AND and the subheading field tag of [sh]. This is typically done when you want to search for a subheading that cannot be applied to the MeSH heading you are also searching.

Example: *hypertension [mh] AND toxicity [sh]*

To **turn off the subheading grouping,** use the tag [sh:noexp]. You may only do this when "free-floating" a subheading**.**

Text Words [tw]

Terms or numbers that are searched with the Text Words [tw] field tag will be searched in the following fields:

- Title
- Abstract
- MeSH headings, Subheadings, Publication Types (includes single words and phrases)
- Other Terms field
- Chemical Names of Substances
- Secondary Source Identifier (The SI field identifies other data sources, databanks and accession numbers of molecular sequences discussed in MEDLINE articles.)
- Personal Name as Subject

Corporate Author [cn]

- Use the [cn] tag to search for corporate authorship of an article. Search the whole name or individual words from the name.

Examples: *american dental association [cn]*
american [cn] AND dental [cn] AND association [cn]

From May 2006 forward, corporate authors are displayed in the order found in the byline of the published article. From 2000 – April 2006, corporate authors are always displayed last in the list of authors.

This field was added in 2001; however this field may be added to some older records retrospectively. Citations indexed pre-2000 and some citations indexed in 2000-2001 display corporate authors at the end of the title field. For comprehensive searches, consider including terms and/or words searched in the title field.

Example: *american dental association [cn] OR*
american dental association [ti]

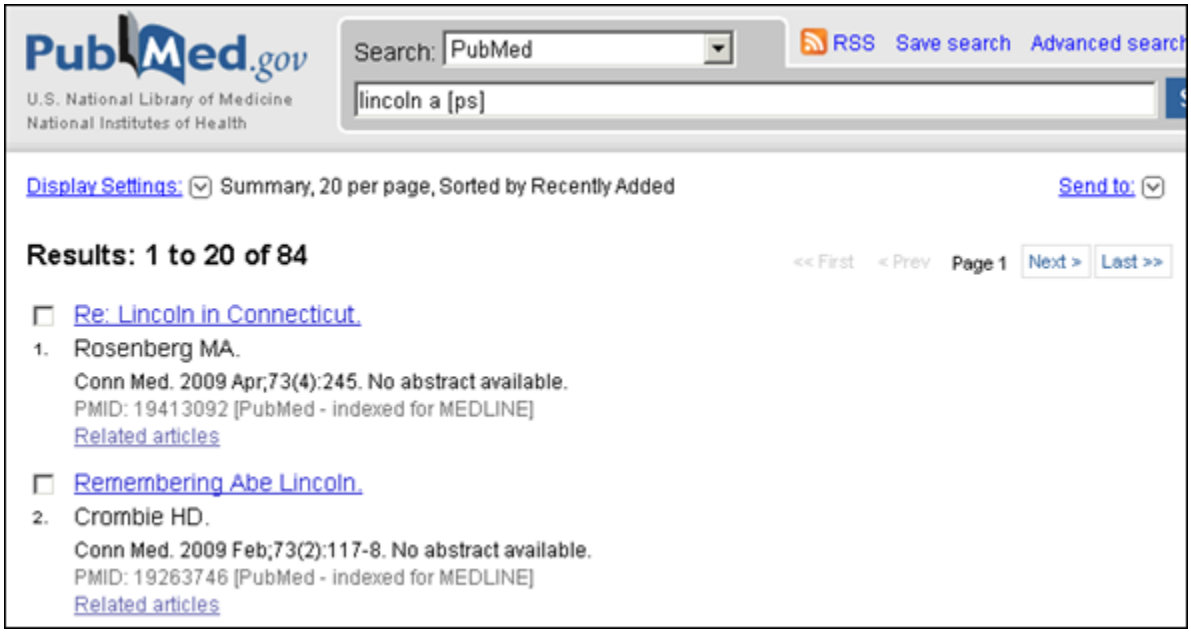
Personal Name as Subject [ps]

- Use the [ps] tag to search for citations to articles about a named individual. The name is searched in the conventional author searching format: lastname + initial(s)

Take Note:

The Personal Name as Subject field is *not* available from the Search Field pull-down menus on the Advanced Search screen.

Example: *lincoln a [ps]*



Date Ranging

- The colon (:) is used between ranging values.
- To search on Publication Date from 1993 to 1997, enter:

  1993:1997 [dp]

- To search on a date, use the format YYYY/MM/DD

Search Tip:

Use the Single Citation Matcher (see page 82) for a fill-in-the-blank Date searching option.

Place of Publication [pl]

- This field indicates the cited journal's country of publication.
- Use the [pl] tag.

Example: *aids AND nigeria [pl]*

Geographic Place of Publication regions are not searchable. In order to retrieve records for all countries in a region (e.g., North America), it is necessary to OR together the countries of interest.

Secondary Source Identifier [si]

- Identifies a secondary source that supplies information, e.g., other data sources, databanks and accession numbers of molecular sequences

  Examples of Data Sources:

  GenBank
  GEO (NLM's Gene Expression Omnibus) – beginning in February 2006
  ClinicalTrials.gov identifier numbers – beginning in July 2005
  International Standard Randomised Controlled Trial Number (ISRCTN) – beginning in mid-2006)
  Reference Sequence (RefSeq) collection accession numbers
  PubChem databases identifiers – beginning in January 2007

- The field is composed of a source followed by a slash followed by an accession number.

- Use the [si] search tag.

Examples:

genbank/af113832 [si]
clinicaltrials.gov/nct00000419 [si]
clinicaltrials.gov [si]
clinicaltrials.gov [si]

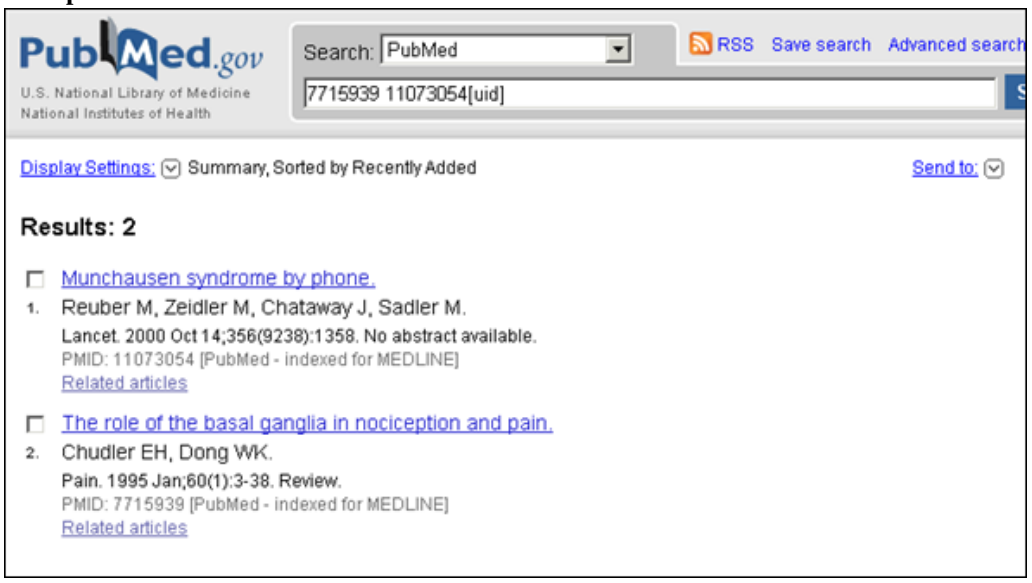
Unique Identifier Searching [pmid]

- To search using the PubMed Unique Identifier (PMID), type in the number with or without the search field tag [pmid].

Example: *11073054*

- You can search for several Unique Identifier numbers by entering each number in the search box separated by a space, PubMed will OR them together. Do *not* enter the OR connector.

Example: *7715939 11073054*



Unique Identifiers as entered in the search box.

PubMed finds the 2 citations.

To find the PubMed Central unique identifier (PMCID), see the MEDLINE or Abstract format for the record in PubMed, or use the PMID: PMCID Converter at http://www.ncbi.nlm.nih.gov/sites/pmctopmid

Affiliation [ad]

- May include the institutional affiliation and address (including e-mail address) of the ***first*** author of the article as it appears in the journal.
- Use the [ad] search tag.
- This field can be used to search for work done at specific institutions.
- The data is how it appears in the original journal article. It is not standardized, therefore the same institution may appear in variant forms.

Example: *cleveland [ad] AND clinic [ad]*

Grant Number [gr]

- Research grant numbers, contract numbers, or both that designates financial support by:
  - an agency of the US PHS (Public Health Service)
  - the Howard Hughes Medical Institute, or
  - eight funding sources from the United Kingdom

- For Public Health Services agencies, the number is followed by the Institute acronym; followed by the agency's hierarchical structure from lower to higher entity, when known; and then followed by the country name.

Examples: LM05545/LM/NLM NIH HHS/United States
CA47147/CA/NCI NIH HHS/United States

- For other funding organizations, the number is followed by the name of the organization; followed by the country name.

Examples: GR072308/Wellcome Trust/United Kingdom
066866/Wellcome Trust/United Kingdom
Howard Hughes Medical Institute/United States

- Use the [gr] search tag.

Example: *lm05545/lm/nlm nih hhs/united states [gr]*

The four pieces of the grant number (e.g., LM05545 – number; LM – acronym; NLM NIH HHS – parts of, or the entire string of the agency's hierarchical structure; and funding country) are each individually searchable using the [gr] tag.

Examples:

lm05545 [gr]	*wellcome trust [gr]*
nlm [gr]	*united kingdom [gr]*

PubMed's online Help links to a Web page detailing Grant Number Information Found in the GR Field in MEDLINE/PubMed (http://www.nlm.nih.gov/bsd/grant_acronym.html).

N O T E S

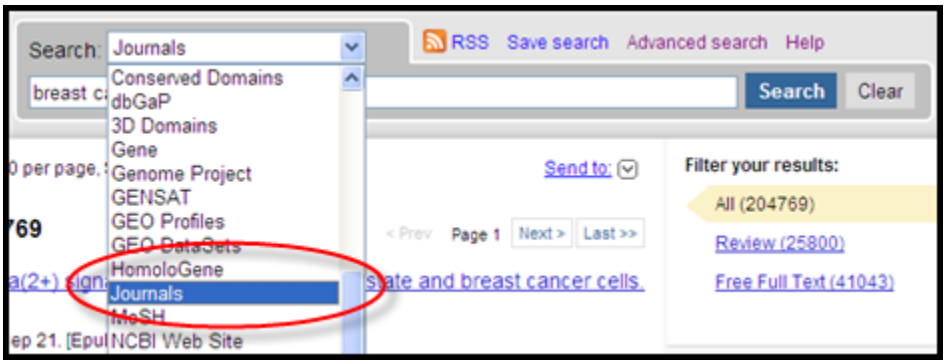
Journals Database

The PubMed Journals database allows you to look up information about a PubMed journal and search for that title. You can search for a journal using:

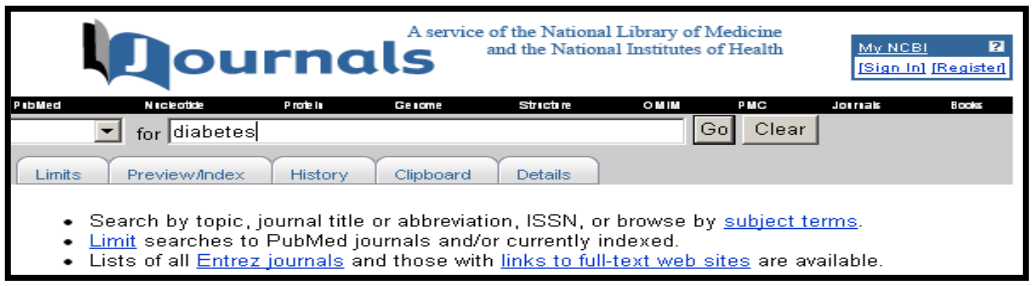
- journal title
- MEDLINE/PubMed title abbreviation
- NLM ID (NLM's unique journal identifier)
- ISO (International Organization for Standardization) abbreviation
- print and electronic International Standard Serial Numbers (pISSNs and eISSNs)
- subject terms (see page 95 of this workbook)

How to get there:

- Click on Journals links from the bottom of the Advanced Search screen; click on Journals Database link from PubMed's homepage; or Click on the Journals Database link from the database selection menu and use the search box:

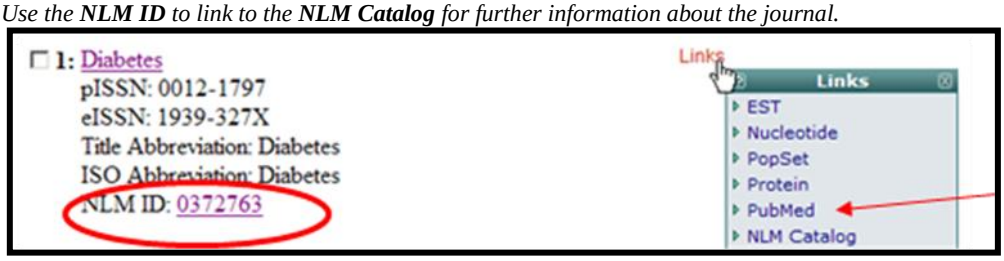


Type your term(s) in the search box.



Result:

*Use the **NLM ID** to link to the **NLM Catalog** for further information about the journal.*

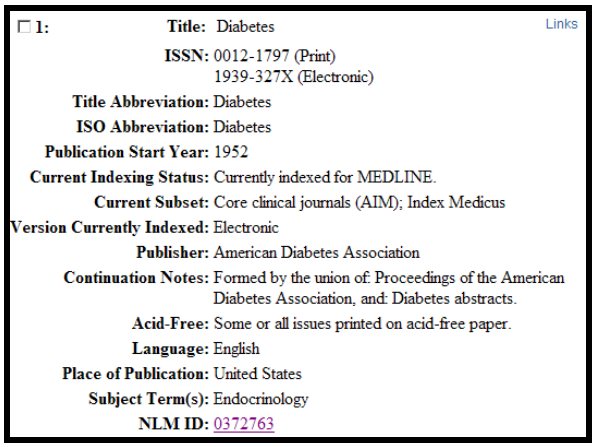


*Use the **PubMed** link from the Links pull-down to retrieve citations for an individual journal in PubMed.*

Take Note:

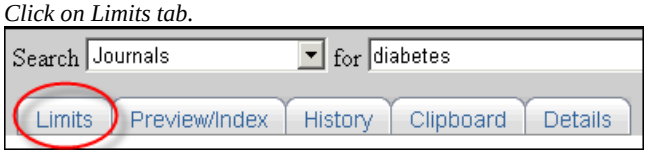
Retrieval display order is alphabetical, except if term has an exact match, which will display first.

Click on the hyperlinked journal title or choose the Full display format to see more information about the title:

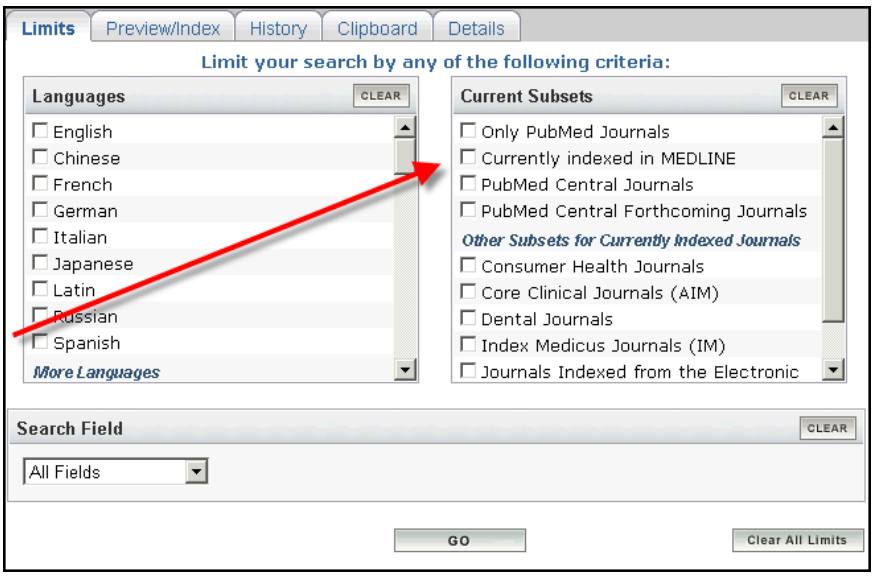


Limit to currently indexed titles, by language or by subset

Click on Limits tab.



Use the checkbox to limit your search to currently indexed MEDLINE journal titles or other criteria.



The Journals database includes journals in ***all*** Entrez databases (e.g., PubMed, Nucleotide, Protein). Use the **Only PubMed journals** option on the Limits page to limit to journals in PubMed.

Subject Term [st]

- Subject terms are assigned by NLM to describe the overall scope of MEDLINE-indexed journals.
- Subject terms will display in the Full display format.
- Use the [st] tag.

Example: *pediatrics [st]*

Search Tip: Searching for non-tagged terms, e.g., pediatrics in the Journals database, will retrieve all journals that include the word pediatrics in the title as well as journals with the Subject Term, Pediatrics

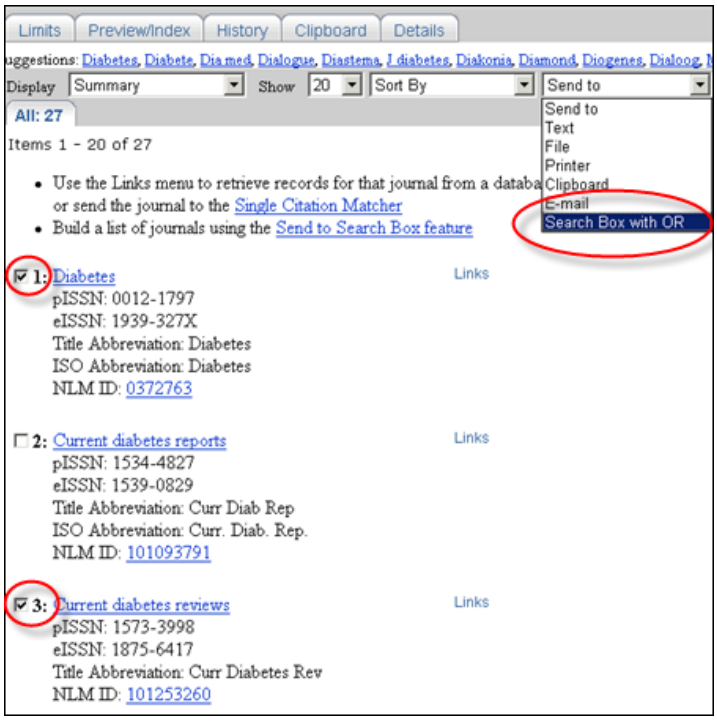
Take Note: The complete list of terms is available at the Journal Subject Terms Web page (http://www.nlm.nih.gov/bsd/journals/subjects.html).

Building a PubMed query for multiple journals

*Click in the **checkbox** to the left of desired journal title.*

*Choose **Search Box with OR** from the Send to menu.*

*Once finished building your search, click **Search PubMed** button.*



Search Tip: Use Save Search and My NCBI to facilitate the task of limiting searches to a specific group of journals.

Quick Tour See the **E-mail Alerts for Articles from Your Favorite Journals** Quick Tour at http://www.nlm.nih.gov/bsd/disted/pubmed.html.

Journals Lists

- On the Journals database screen, click on **links to full-text web sites** for a list of full-text journals available on the Web to which PubMed is currently linked.

Some journals may require that you register, subscribe, or pay a fee in order to view the full-text of an article.

Contact the journal publishers as noted on their individual Web sites for specific access information.

- Click on **Entrez journals** to FTP a list of all journals that are included in PubMed in the GNU Zip, Uncompressed, UNIX Compress, or PKZIP format.

Practice Exercises: Search Tags

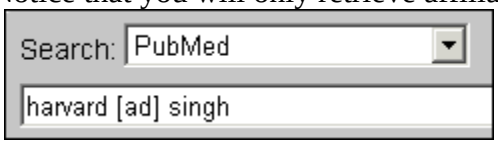
Use search field tags when doing these exercises. Remember you can use the History feature to obtain search statement numbers to combine searches.

1. Find references to articles written by the author Singh who was affiliated with Harvard at the time of publication.
   (Notice that you will only retrieve affiliation information for the first author.)

2. Find references to articles about Winston Churchill.

Suggested Answers: Search Tags

1. Find references to articles written by the author Singh who is affiliated with Harvard. (Notice that you will only retrieve affiliation information for the first author.)

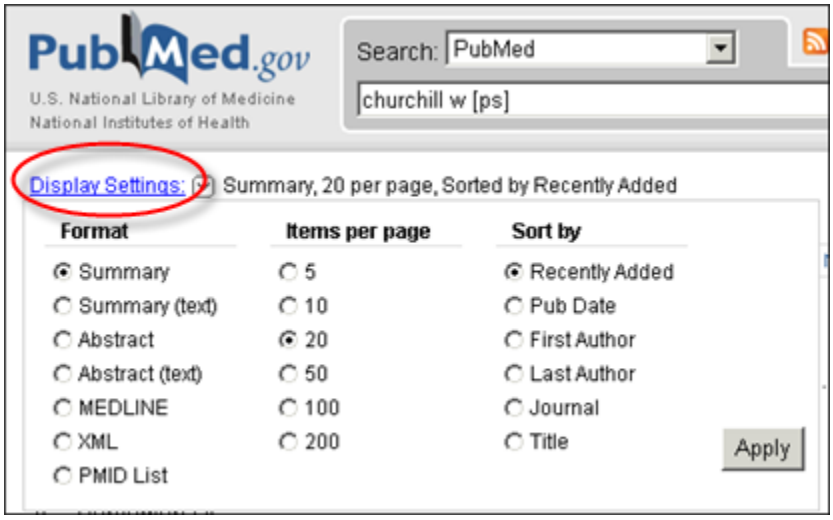


2. Find references to articles about Winston Churchill.

Managing the Results

Display Settings

The **Display Settings** menu allows the user to select record display format, number of items per page, and sort order.



Format

Summary Format

Multiple PubMed citations are initially displayed in the **Summary** format.

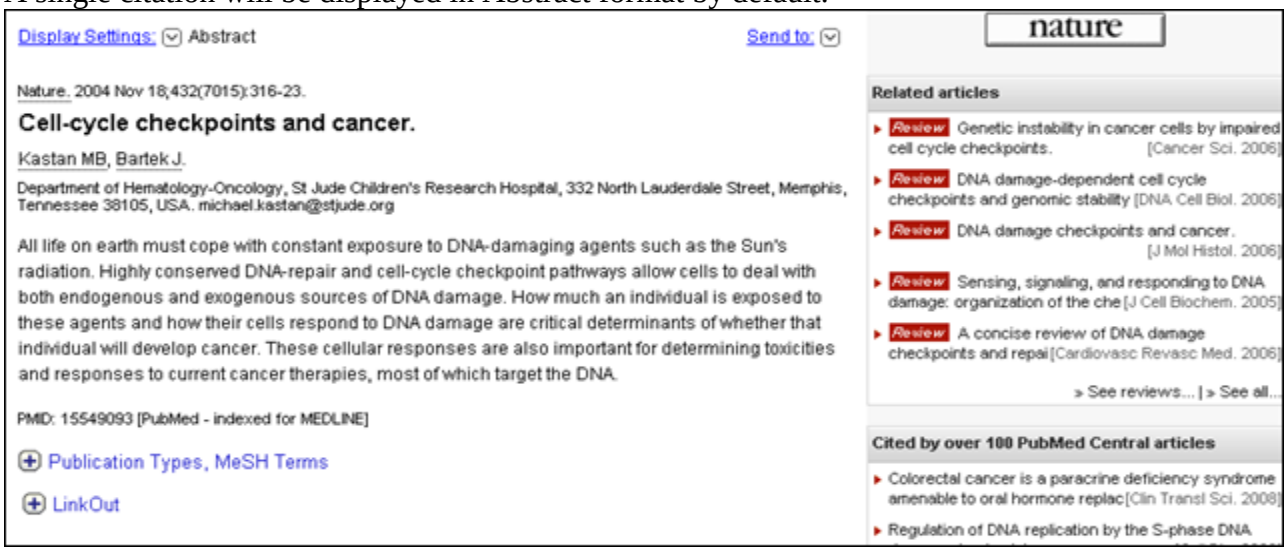
The Summary format may include the following:

- **Title of the article:** The article title serves as the link to the full display for the record (Abstract format). Most foreign language titles will be translated into English and placed within brackets.
- **Author Name(s):** Author names are displayed and are links to a PubMed search for that author's works
- **Corporate Author:** Identifies the corporate authorship of an article.
- **Source:** Includes journal title abbreviation, date of publication, volume, issue, and pagination. A mouseover of journal title abbreviation displays the full journal title.
- PubMed Unique Identifier (PMID).
- A status tag: **[PubMed - as supplied by publisher], [PubMed - in process], [PubMed - indexed for MEDLINE], [PubMed - OLDMEDLINE] or [PubMed]**

- **Related Articles:** Link to the Related Articles set of citations.
- **Free article:** Appears when ***free*** full text is available.
- May also include language (for non-English articles) and Publication Type if the article is a review or retracted publication. Articles without abstracts will display the notation: "No abstract available".
- Annotations to associated citations (e.g., Errata).

Abstract Format

A single citation will be displayed in Abstract format by default.



The Abstract format may include the following information:

- **Source** (journal title abbreviation - mouseover for full title and link for search options; date of publication; volume; issue; and pagination)
- **Title**
- On non-English language articles, [Article in language] tag
- **Author(s)** with author names displayed as "search links" to author searches.
- **Corporate Author**
- **Affiliation** (address) of first author
- **Abstract** (if present) from published article
- **Annotations** to associated citations (e.g., errata)
- **PMID**
- **Status tag**
- Supplemental Information (expand the section to view):
    - **Publication Types** (except for "Journal Article") with search links
    - **MeSH Terms** with search links (if present)
    - **Personal Name as Subject** (if present)
    - (Chemical) **Substances** (if present) with search links
    - **Grant numbers** (if present) with search links
    - ClinicalTrials.gov identifier number with search links (if present)
- Links to external resources (including **LinkOut**, see page 121)
- Icons with link to full text (if present)
- **Related articles** (if viewing a single citation)

MEDLINE Format

Two- to four-character tagged field format displaying all fields of the PubMed record.

```
PMID- 15549093
OWN - NLM
STAT- MEDLINE
DA  - 20041119
DCOM- 20041221
LR  - 20061115
IS  - 1476-4687 (Electronic)
VI  - 432
IP  - 7015
DP  - 2004 Nov 18
TI  - Cell-cycle checkpoints and cancer.
PG  - 316-23
AB  - All life on earth must cope with constant exposure to DNA-damaging agents such as
      the Sun's radiation. Highly conserved DNA-repair and cell-cycle checkpoint
      pathways allow cells to deal with both endogenous and exogenous sources of DNA
      damage. How much an individual is exposed to these agents and how their cells
      respond to DNA damage are critical determinants of whether that individual will
      develop cancer. These cellular responses are also important for determining
      toxicities and responses to current cancer therapies, most of which target the
      DNA.
AD  - Department of Hematology-Oncology, St Jude Children's Research Hospital, 332
      North Lauderdale Street, Memphis, Tennessee 38105, USA. michael.kastan@stjude.org
FAU - Kastan, Michael B
AU  - Kastan MB
FAU - Bartek, Jiri
AU  - Bartek J
LA  - eng
PT  - Journal Article
PT  - Research Support, Non-U.S. Gov't
PT  - Research Support, U.S. Gov't, P.H.S.
PT  - Review
PL  - England
TA  - Nature
JT  - Nature
JID - 0410462
SB  - IM
MH  - Animals
MH  - *Cell Cycle
MH  - DNA Damage
MH  - Humans
MH  - Neoplasms/enzymology/*metabolism/*pathology
MH  - *Signal Transduction
RF  - 96
EDAT- 2004/11/19 09:00
MHDA- 2004/12/22 09:00
CRDT- 2004/11/19 09:00
AID - nature03097 [pii]
AID - 10.1038/nature03097 [doi]
PST - ppublish
SO  - Nature. 2004 Nov 18;432(7015):316-23.
```

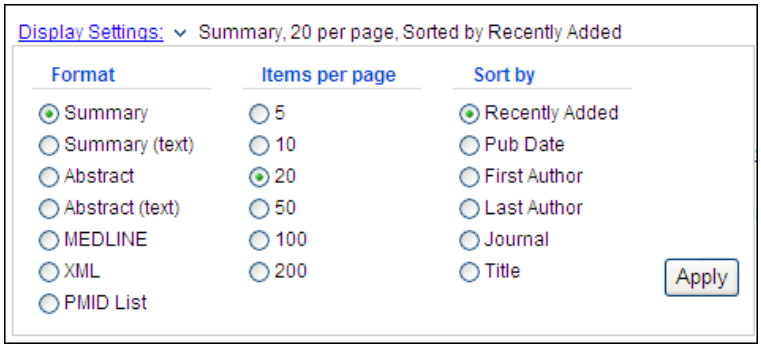
- Use Send to File (see page 103) to download using this format into reference management software
- For further information on the data found in the fields found on the MEDLINE display format, see MEDLINE®/PubMed® Data Element (Field) Descriptions (http://www.nlm.nih.gov/bsd/mms/medlineelements.html)

Other Display Formats

- Use your preferred Text format for printing.
- Use the PMID List to store batches of IDs for later retrieval.

Items per page

- PubMed initially displays search results in batches of 20 citations per page.
- Click on the **Display Settings** menu to select a different number.
- Click Apply
- PubMed redisplays the citations based on your selection.

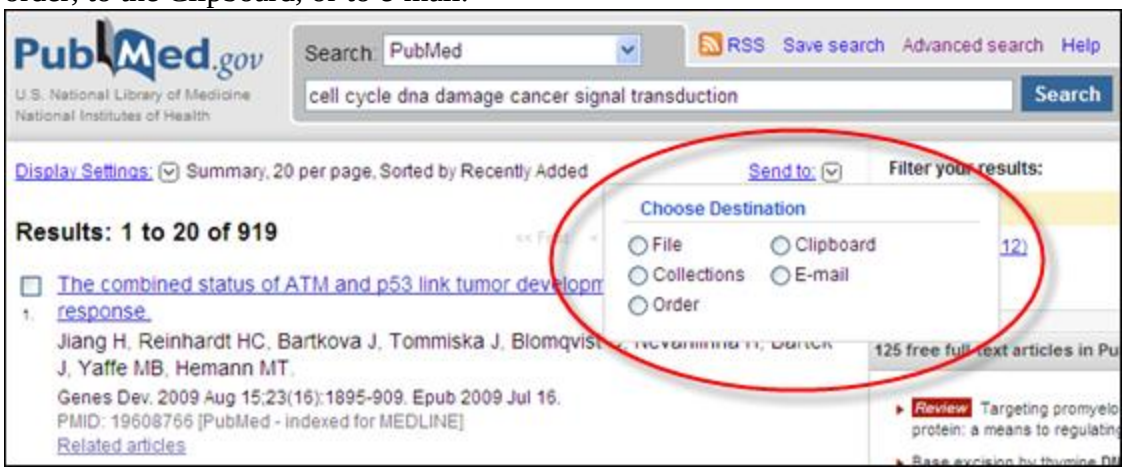


Sort by

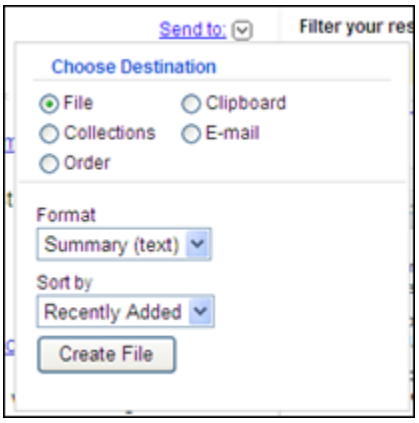
- PubMed initially displays search results by Recently Added
- To sort items by Publication date, First Author, Last Author, Journal or Title, select the field of interest in the **Display Settings** menu and click Apply.

Send to…

Select Send to: to send selected or all records in your results to a file, to My NCBI Collections, to order, to the Clipboard, or to e-mail.

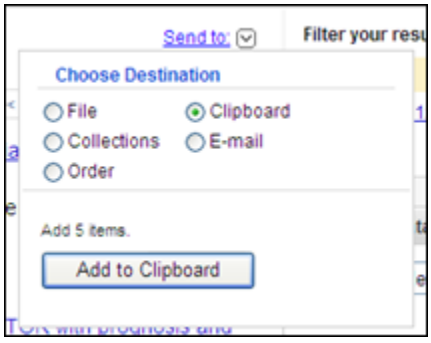


Send to File

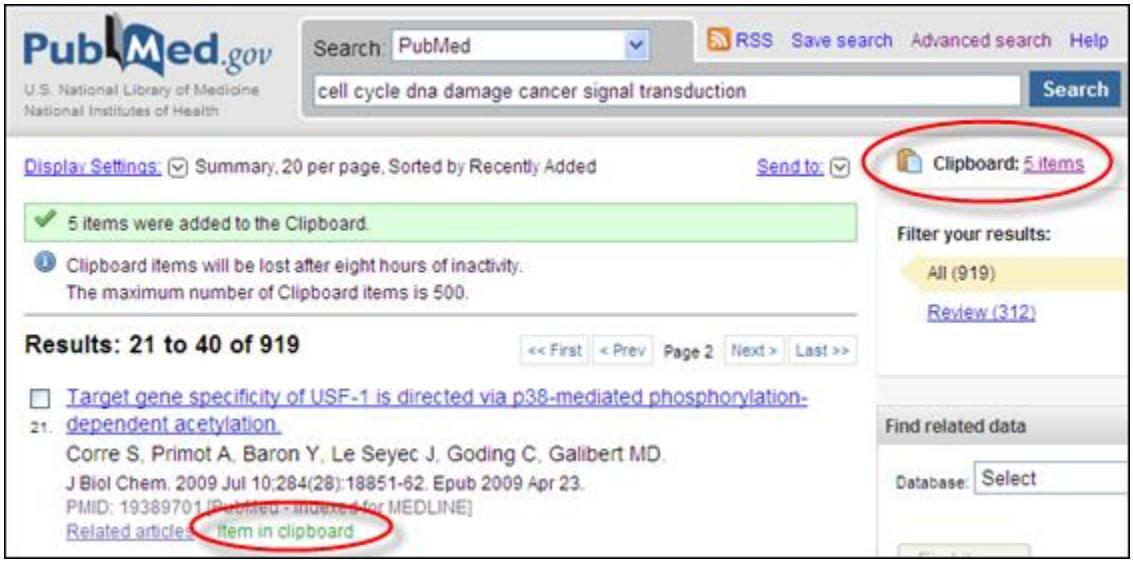


- To save and send your **entire set of search results** to a file, use the Send to: menu, select File, and select your formatting and sorting preferences
- To mark **selected citations** to save and send to a file, click on the check-box above the item number as you go through each page of your retrieval. After you have finished selecting citations, then select File from the Send to menu and select your preferences.
- Send to File with Summary (text) format displays the citations with Author names first followed by title.

Send to Clipboard



- The Clipboard allows you to collect selected citations from one search or several searches that you may want to print, save, or order.
- The maximum number of items that can be placed in the Clipboard is **500**.
- To place an item in the Clipboard, click on the box above the citation and select **Clipboard** from the Send to menu.
- Once you have added a citation to the Clipboard, the item will display a note, "Item in Clipboard" and the Clipboard link displays below the search box.

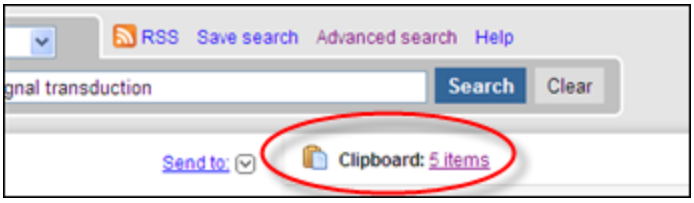


Clipboard Tips:

- ✓ If you send items to the **Clipboard** without selecting citations using the check-box, PubMed will add up to 500 citations from your retrieval to the clipboard.
- ✓ The maximum number of items that can be added to the clipboard is 500.
- ✓ The clipboard will be lost after 8 hours of inactivity.

Using the Clipboard

- To view the contents of our clipboard, click on Clipboard link in the right column of your search results:



You are directed to the Clipboard screen:

- You can use the same Display Settings and Send to: options with the citations in the Clipboard.

Deleting citations from the Clipboard

- To delete citations on the Clipboard, click **Remove from clipboard** next to the item, or select the item(s), and click **Remove selected items**
- To empty the Clipboard, select **Remove all items**

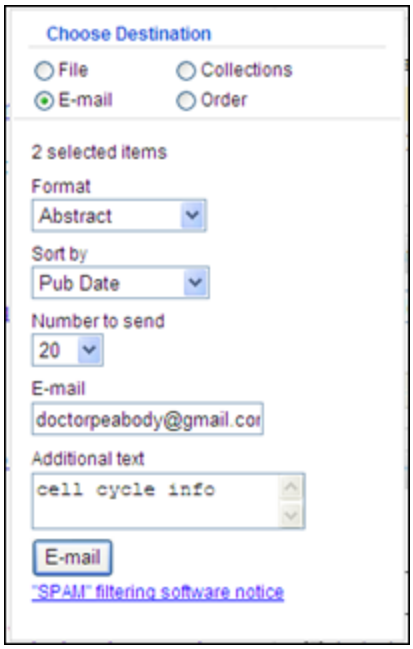
Citations on the Clipboard may be incorporated into a search statement using #0. For example, limit the items on the Clipboard to English language citations using the following search:

#0 AND english [la]

This does not affect or replace the Clipboard contents.

Send to E-mail

- Select E-mail from the Send to menu.
- Select your formatting and sorting preferences.
- Select the number to send (if sending more than the first 20 records).
- Enter an e-mail address. Only one is permitted, to prevent spam.
- Add additional text if you wish.
- Click E-mail.



E-mail Tips:

√ You may E-mail up to 500 items.

√ A default E-mail address may be stored via My NCBI User Preferences.

Send to Collections: See page 106
Send to Order: See page 123

My NCBI Collections

My NCBI Features

- My Saved Data
    - Searches: save search strategies to get updates, including automatic e-mail updates.
    - Collections: save search results.
    - My Bibliography: collect citations for your publications.
- Search Filters: group your retrieval by topics of interest to you.
- Preferences: select highlighting and to expand the supplemental data in the Abstract display

If your Web browser is set to block pop-ups, you will need to allow pop-ups from NCBI Web pages to use My NCBI.

Getting to My NCBI

- PubMed's banner will display links to My NCBI.
- The **My NCBI** link goes to the My NCBI home page.
- **Sign In** links to the Sign In page and to registration.

Registering for My NCBI

- To use My NCBI you need to register for an account.
- If you choose to include an e-mail address, you will receive a confirmation e-mail (see page 113 for details).

Sign In:

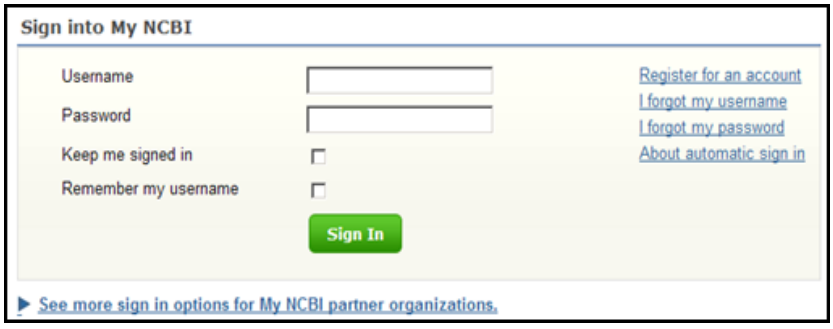
Session-Only or Automatic

Check the "Keep me signed in" and/or "Remember my username" boxes if you are using your own computer to access My NCBI.

*Click **About automatic sign in** for more information.*

"Linked" Accounts

*If you have an eRA Commons or NIH account, click on **See more sign in options for My NCBI partner organizations**. You may be able to use your NIH or eRA Commons credentials to sign into My NCBI.*



Collections

- Use Collections to save search results within My NCBI.

Create a Collection

Step 1: Select search result items you wish to save

*Step 2: Choose **Collections** from the Send to menu.*

Step 3: Click Add to Collections

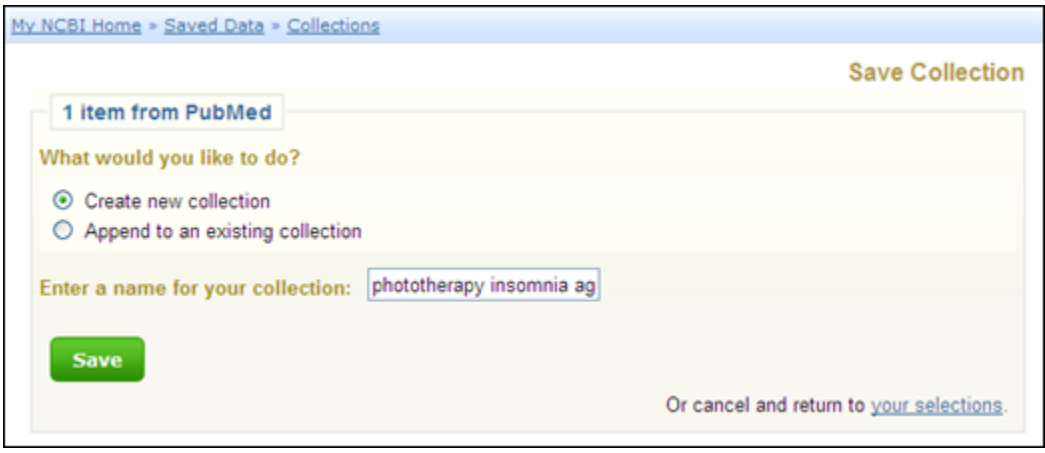
If you are not already signed into My NCBI, you will be prompted to do so.

If you do not select items, all items (up to 5000) will be saved to the collection you are creating.

Step 3:
Choose to create a new collection.

Rename your collection.

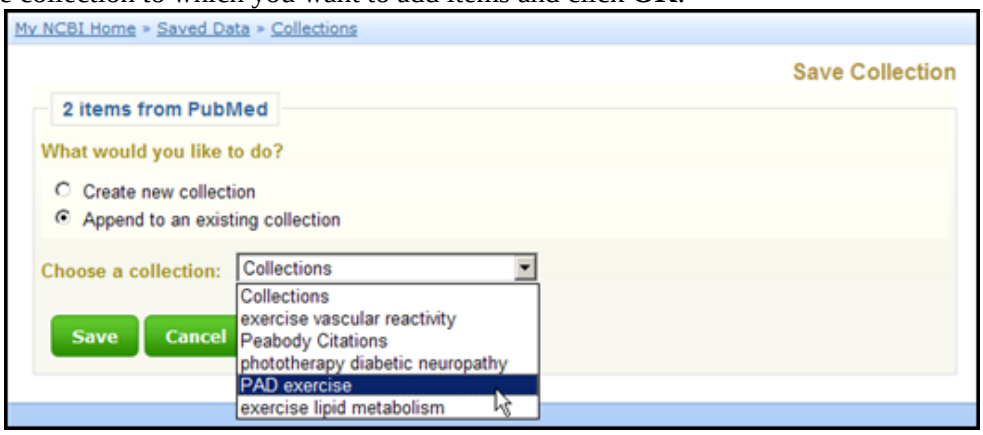
*Click **Save**.*



The maximum number was recently increased to 5,000 from 500. If you have saved any Collections prior to February 2009, then these will remain with 500 as the maximum number unless you recreate the Collection again.

Append to a collection

- Choose **Append to an existing collection** from the Save Collection pop-up window.
- Choose the collection to which you want to add items and click **OK**.

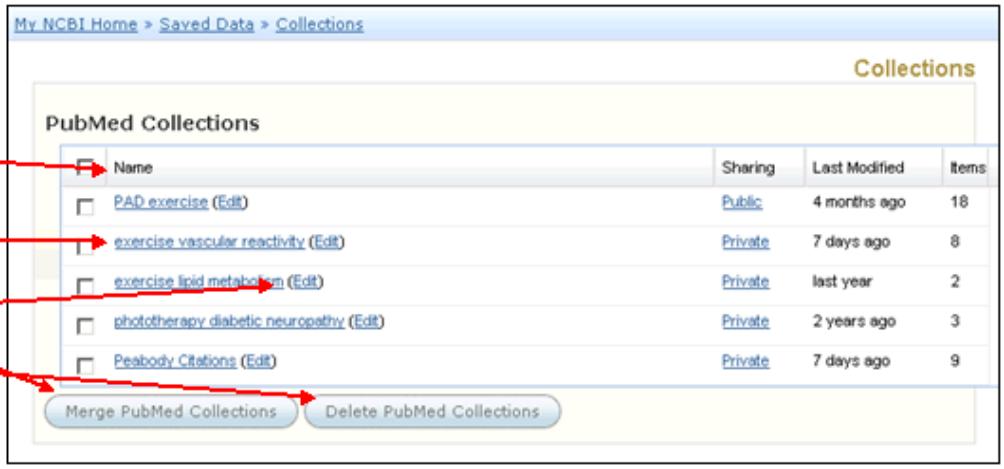


Take Note: You can add up to a maximum of 1500 items to a collection.

Edit a collection

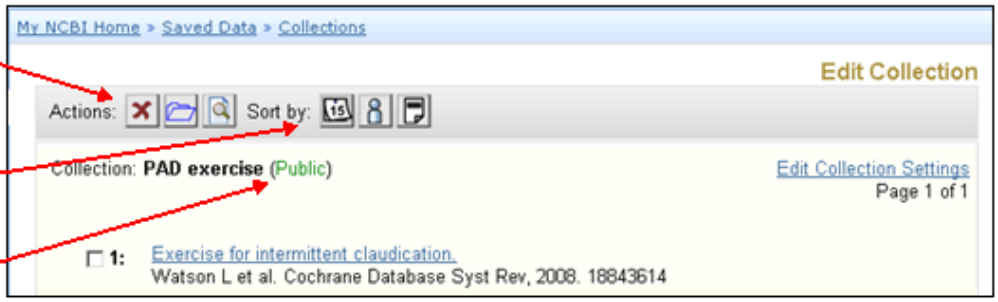
From the My NCBI Collections page you may:

- *Sort by column using the column name.*
- *View the collection in a PubMed results screen to print, save or e-mail.*
- *Edit collections*
- *Merge collections*
- *Delete collections*



From the Edit Collection page you may:

- *Delete items from the collection*
- *Rename the collection.*
- *View in PubMed*
- *Sort by publication date, first author or article title*
- *Access Collection Settings to change your collection to Public or Private*



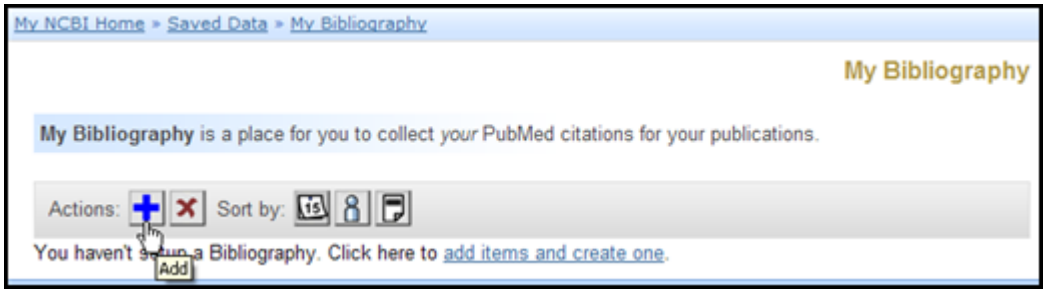
My Bibliography

My Bibliography is designed to make it easier for authors to search and collect citations for their publications.

Create Your Bibliography

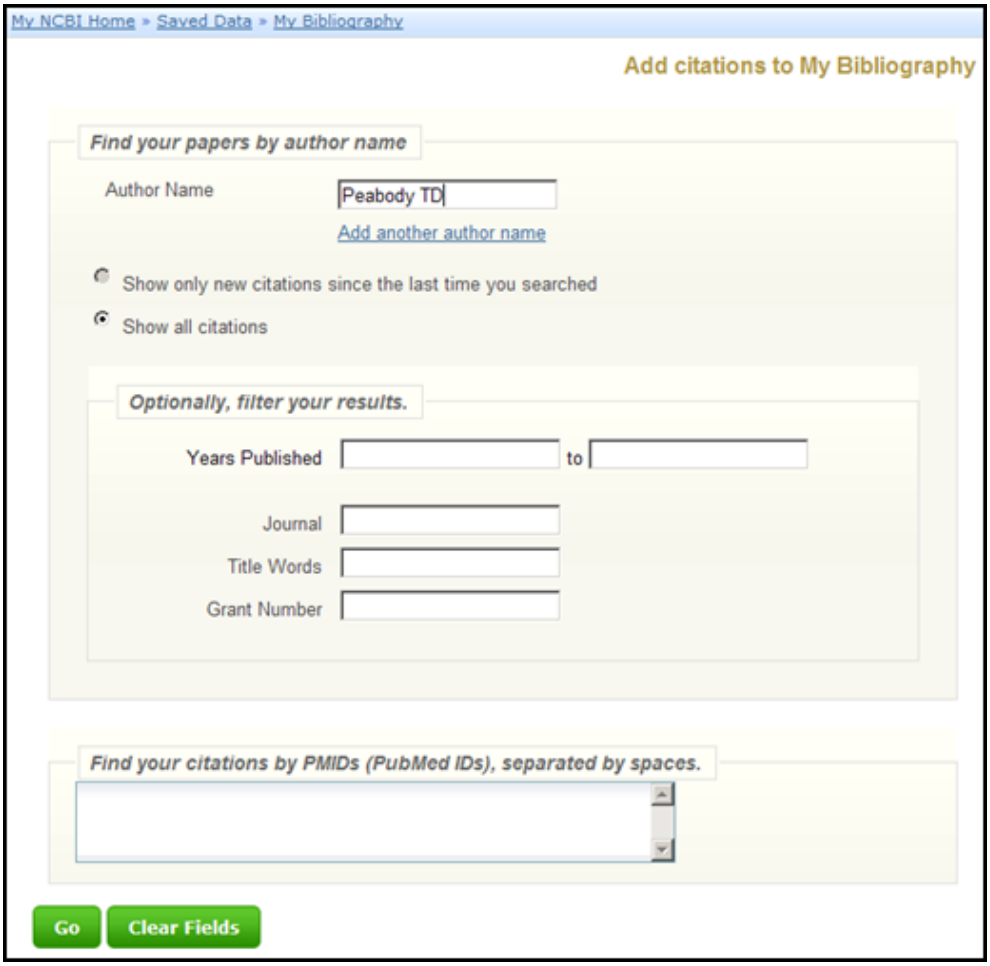
- In the My Saved Data section of My NCBI, click on the link to My Bibliography:

- On the My Bibliography page, select the  to create or add items to a bibliography:



Create a search for your citations:

- *Enter your name in the Author Name field*
- *If you have written under another name, select Add another author name*
- *Show all citations to create your bibliography*
- *To differentiate your work from another author with the same name, select filter options.*
- *Alternatively, enter PubMed IDs for your citations.*
- *Click Go to run the search.*



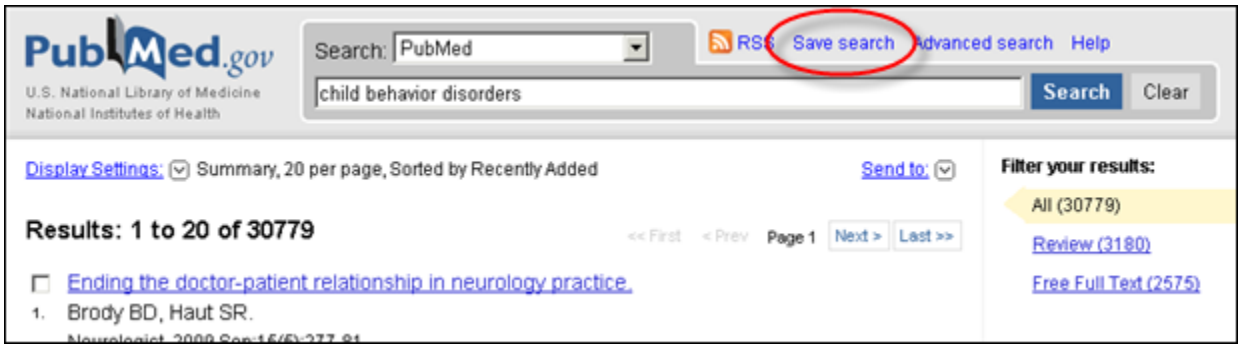
- *Select your citations using the checkboxes to the left.*
- *When finished selecting your citations from all pages of results, select the* Add to My Bibliography *button at the bottom of the page.*

Your bibliography is created. You can add items to the bibliography by returning to Saved Data > My Bibliography and using the  .

Saving the Search

Saving Search Strategies with My NCBI

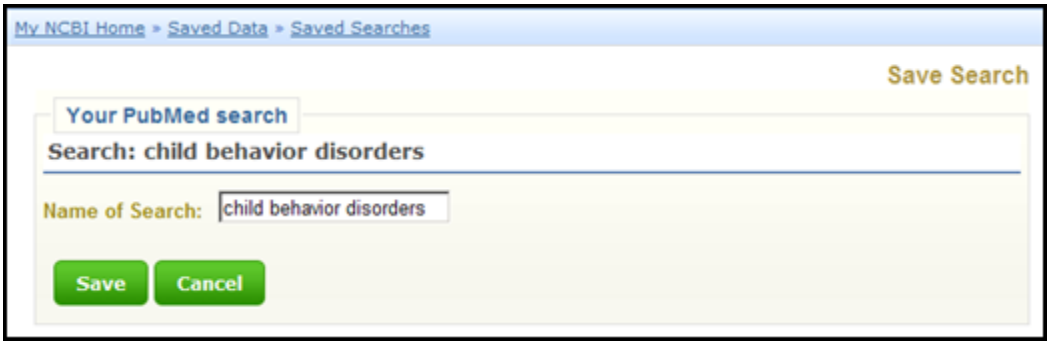
- Run your PubMed search.
- From the Results page, click on the **Save Search** link above the search box.



- PubMed will open a separate window in your browser to start the saving process. (If you are not already signed into My NCBI, you will be prompted to do so).

- Be aware that the default search name does not include any Boolean operators, search statement numbers or search tags, if entered. This name does not affect the strategy, so it is advisable to edit it to something short, yet meaningful.

- *You can edit the name of the search.*
- *This name will be part of the Subject line of automatic e-mail updates.*
- *Click Save.*

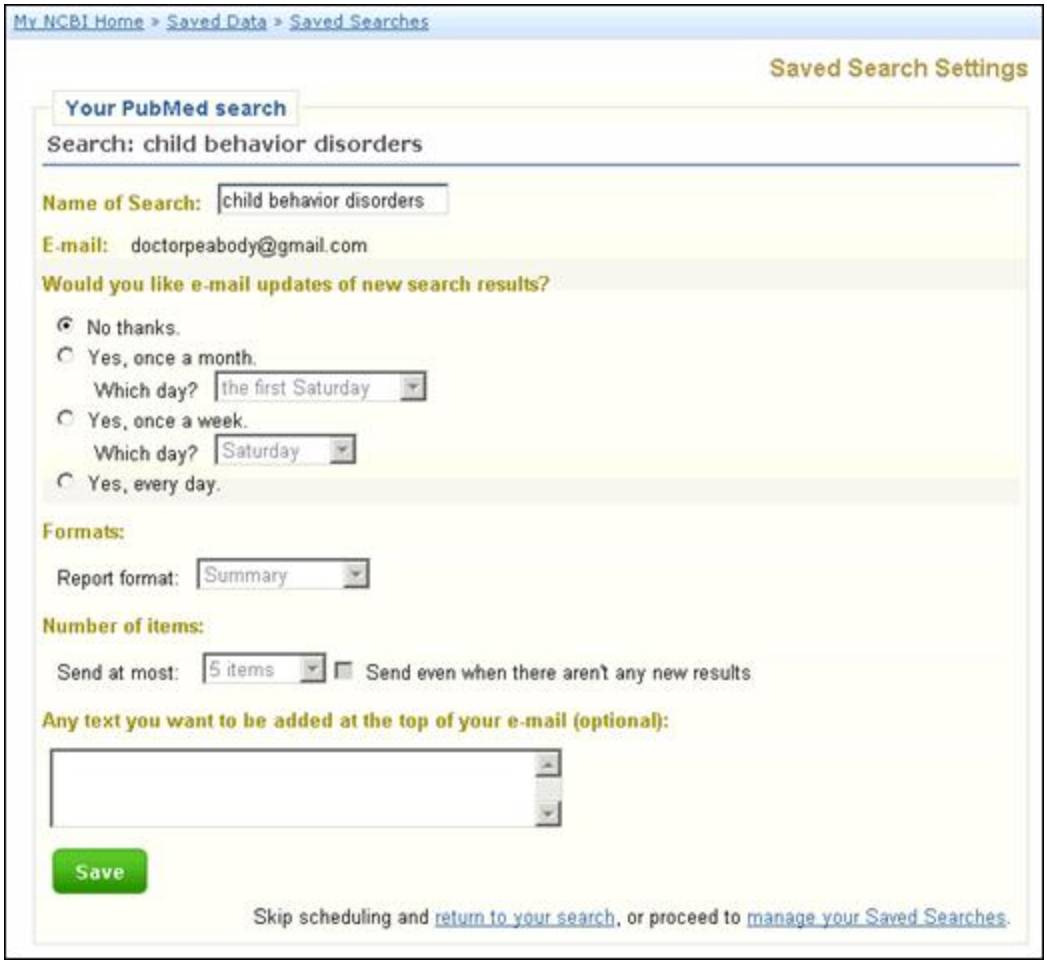


Your search strategy is saved and the Saved Search Settings Window is displayed (see next page).

Setting Up Automatic Updating

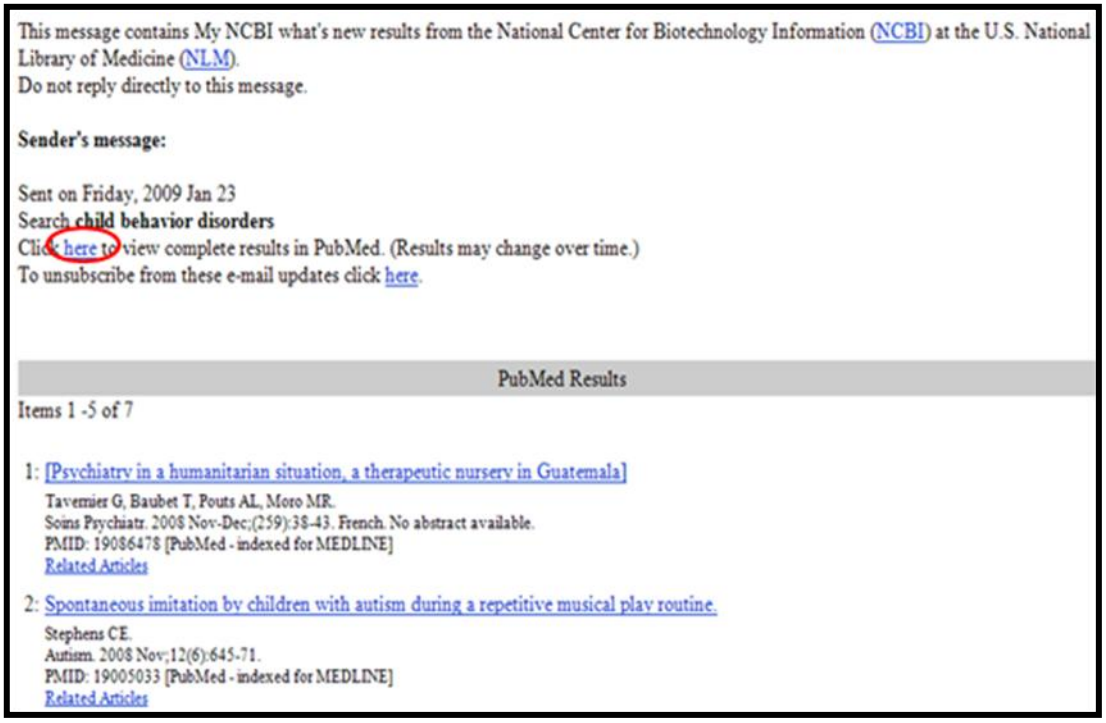
Set up your updates using the Saved Search Settings page:

- *Modify the name of the search, if desired.*
- *Enter an **e-mail** address for the account if you haven't already.*
- *Select how often you want to get updates - monthly, weekly, or daily.*
- *Select the **format** (Summary, Abstract, etc.).*
- *Select the **Number of items** to be sent with each update. A link in the e-mail will take you to the total update results in PubMed.*
- *If you want to know when an update retrieved no citations, select **Send even when there aren't any new results**.*
- *The text box is a place to add a note. This text will display on each e-mail update as "Sender's message."*
- *Click Save.*



Partial e-mail update results:

*Click on the word, "**here**" to view the complete results. For this example, to see all 7 citations.*



This message contains My NCBI what's new results from the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM).
Do not reply directly to this message.

Sender's message:

Sent on Friday, 2009 Jan 23
Search **child behavior disorders**
Click here to view complete results in PubMed. (Results may change over time.)
To unsubscribe from these e-mail updates click here.

PubMed Results

Items 1 -5 of 7

1: [Psychiatry in a humanitarian situation, a therapeutic nursery in Guatemala]
Tavernier G, Baubet T, Pouts AL, Moro MR.
Soins Psychiatr. 2008 Nov-Dec;(259):38-43. French. No abstract available.
PMID: 19086478 [PubMed - indexed for MEDLINE]
Related Articles

2: Spontaneous imitation by children with autism during a repetitive musical play routine.
Stephens CE.
Autism. 2008 Nov;12(6):645-71.
PMID: 19005033 [PubMed - indexed for MEDLINE]
Related Articles

Important Facts about the E-mail for My NCBI Account

- Each My NCBI account can have **only one** e-mail address that will be used for all automatic e-mail updates saved in that account.
- If, at a later time, you change the e-mail address for your account, the new e-mail address will be used for **all** automatic updates following confirmation (see below).
- To change the e-mail address on an account, go to **Preferences** on the My NCBI sidebar.

The address for PubMed's Send to E-mail feature *can* be changed for individual e-mails on the Send to E-mail page without affecting the e-mail address used for the My NCBI account.

The Confirmation E-mail

- The first time an automatic e-mail update is created for an account, or if the e-mail is changed in User Preferences, a confirmation e-mail will be sent to that address.
- No automatic updates will be sent to an address until it has been confirmed.

Manually Updating Searches

- To manually update a search, go to My Saved Data > Saved Searches > Manage in My NCBI.
- Check the box to the left of the search to be updated and click **Show What's New** at the bottom of the page.
- My NCBI will indicate if there are any new citations retrieved by the strategy since your last update.
- If you link to the results, i.e., complete the update, your saved search list will reflect the date and time of the update.

About the Updates

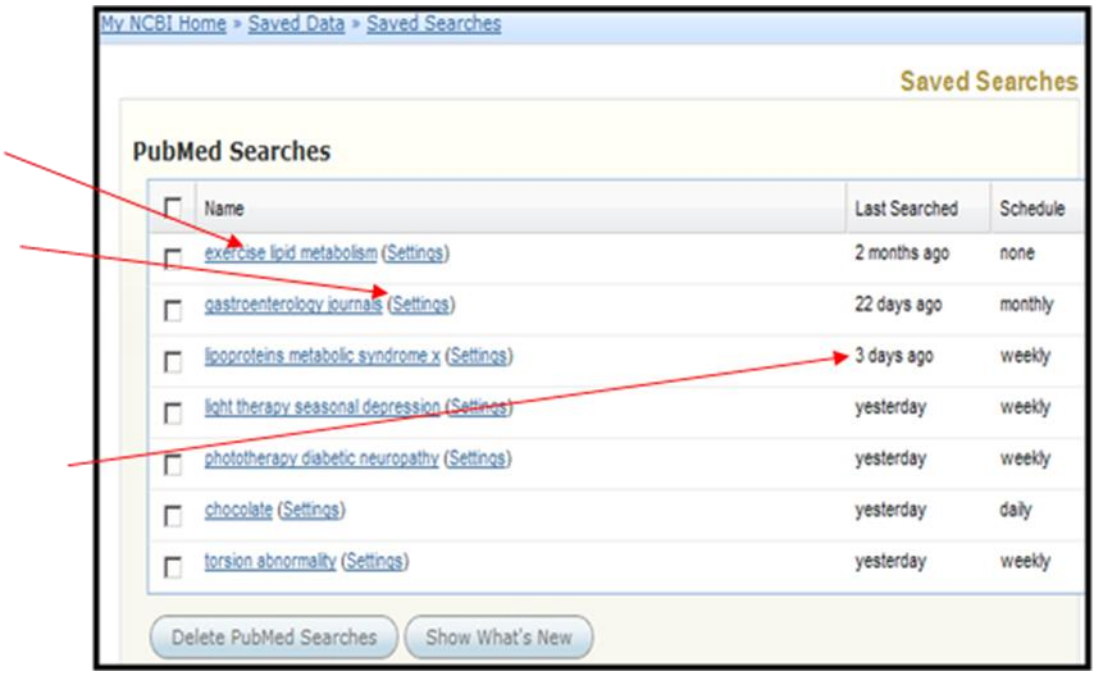
- The update strategies used for My NCBI are detailed in PubMed's Help.
- New or modified searches can be generated no sooner than the next day. For example, this morning, you changed the frequency for an update from Monthly to Daily. The first update will be sent tomorrow.

Additional Functions available from the Saved Searches page

Saved searches can be run to retrieve total results, i.e., not limited to new citations. Click on the name of the search. (This will not affect future updates.)

*Click on **Settings** to go to the Saved Search Settings page where you can make changes (e.g., to frequency or format of e-mail updates).*

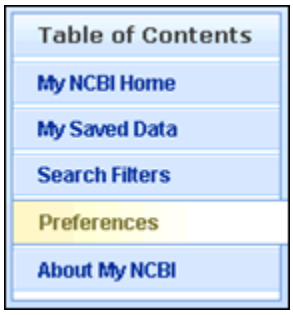
*Hold your cursor over the data in the **Last Searched** column to show the date the last e-mail update was sent or manually updated.*



Modifying a Strategy: Save a New One and Delete the Old

- Saved search strategies cannot be edited. To modify a strategy, re-save it with your changes.
- To delete a search, select the search using the check box and click on the **Delete PubMed Searches** button at the bottom of the page.

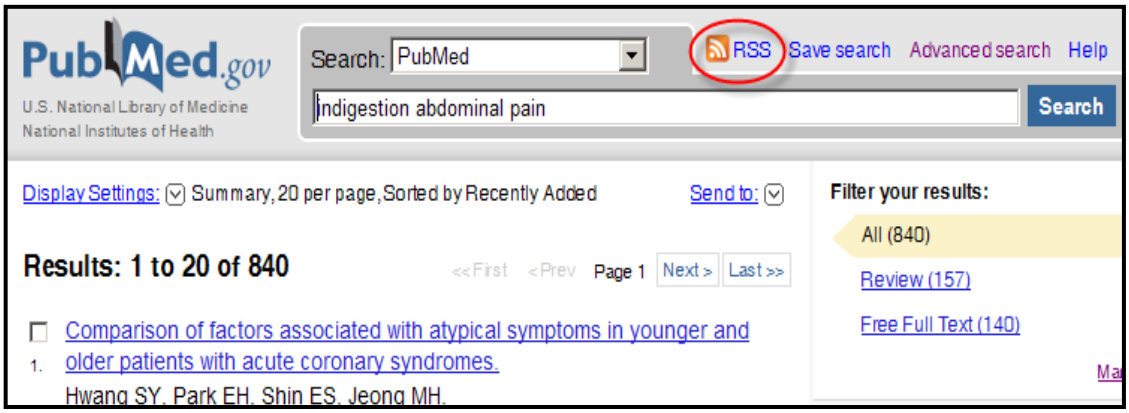
Changing the E-mail Address for an Account



- **Preferences** is accessible via a link on the My NCBI sidebar. You can change the e-mail address for your My NCBI account here.
- Keep in mind, anytime you change the e-mail for an account, all automatic updates will be sent to that address following confirmation.

RSS

RSS feeds bring content (like news items) from multiple online sources into one reader or Web page. The feeds are dynamically updated as new items are added from each source. An RSS reader is required and many are available to download free from the Web or incorporated into e-mail software. Each RSS reader behaves and displays data differently.

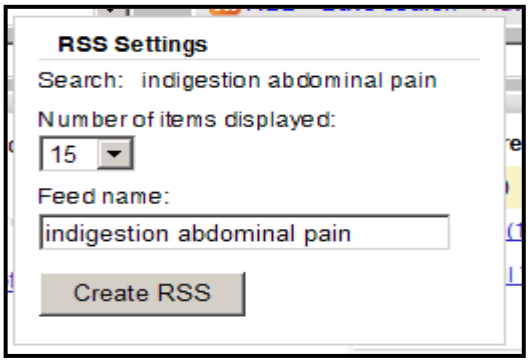


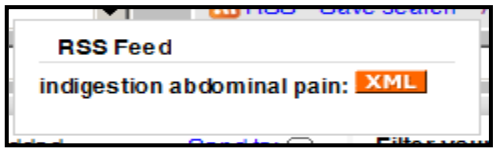
*Select **the RSS link***

An options menu appears:

Change these selections if needed.

*Click **Create RSS***





Drag the XML button to your feed reader OR Click the XML icon to obtain the URL from the address line.

Copy and paste the URL into the "subscribe" form in your RSS reader.

N O T E S

Practice Exercises: Managing the Results and Saving the Search

1. Create a My NCBI account and sign in (or sign in to your existing account).

2. Using the Advanced Search screen, find English-language articles on clinical trials using light therapy to treat seasonal depressive disorder. Show all results in Abstract format on one page. Select three or four citations and save them in a Collection.

3. Save your light therapy search and set up weekly automatic updates in Abstract format.

Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

Suggested Answers: Managing the Results and Saving the Search

See pages 106 and 111 for instructions on #1 and #3.

2. Using the Advanced Search screen, find English-language articles on clinical trials using light therapy to treat seasonal depression. Show all results in Abstract format on one page, sorted by publication date. Select three or four citations and save them in a Collection.

Run a search for light therapy seasonal depressive disorder.

Select Clinical Trial as Type of Article (publication type) and English as language.

Using the Display Settings menu:

Select Abstract display.

Change Items per page to 200.

Sort by Publication Date

On results page:

Select citations of interest.

Select Send to Collections.

N O T E S

Getting the Articles

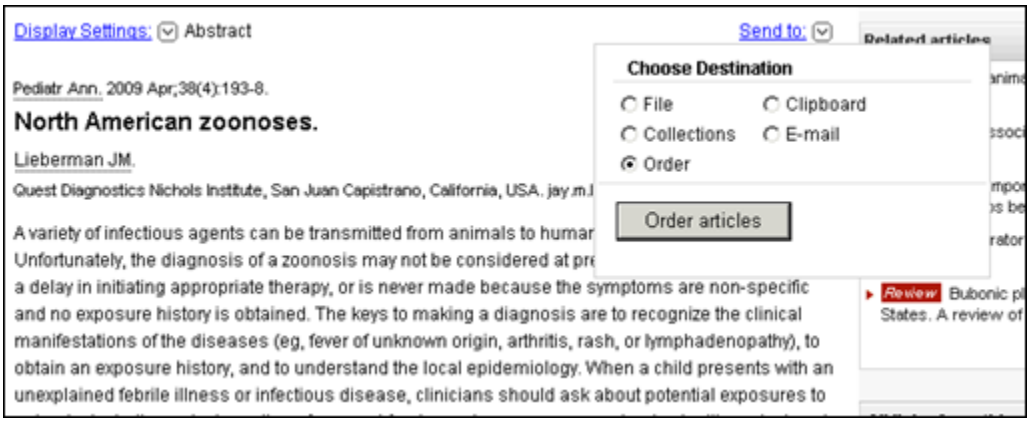
PubMed does not include copies of journal articles. However, PubMed does offer links to the full text of journal articles when links are available. Access to some articles will be free. Access to others will require payment.

LinkOut

- Links to full text resources from PubMed are available through a service called LinkOut.
- When you click on LinkOut icons, you leave PubMed and are directed to the full text at an external site.
- The National Library of Medicine does not hold the copyright to this material, and cannot give permission for its use. Users should review all copyright restrictions set forth by the full text provider before reproducing, redistributing, or making commercial use of material accessed through LinkOut.
- LinkOut provides links from PubMed and other Entrez databases to a wide variety of relevant web-accessible online resources including full-text publications.
- Look for icon links to full text resources on the Abstract display.
- Activate icons to link to your library subscriptions using My NCBI filters (see page 124)

The icon links to full-text from the Abstract format.

Send to Order



- Select **Order** from the Send to menu (from any results screen or the Clipboard) to use an automated document ordering program called **Loansome Doc**.

What is Loansome Doc?

The Loansome Doc feature allows you to order the full-text of an article from a Loansome Doc participating library. Prior to using this feature, you need to establish an agreement with a Loansome Doc participating library. Your Loansome Doc library will provide you with their **Library ID**, which is needed when setting up the service within PubMed or the NLM Gateway.

What does it cost?

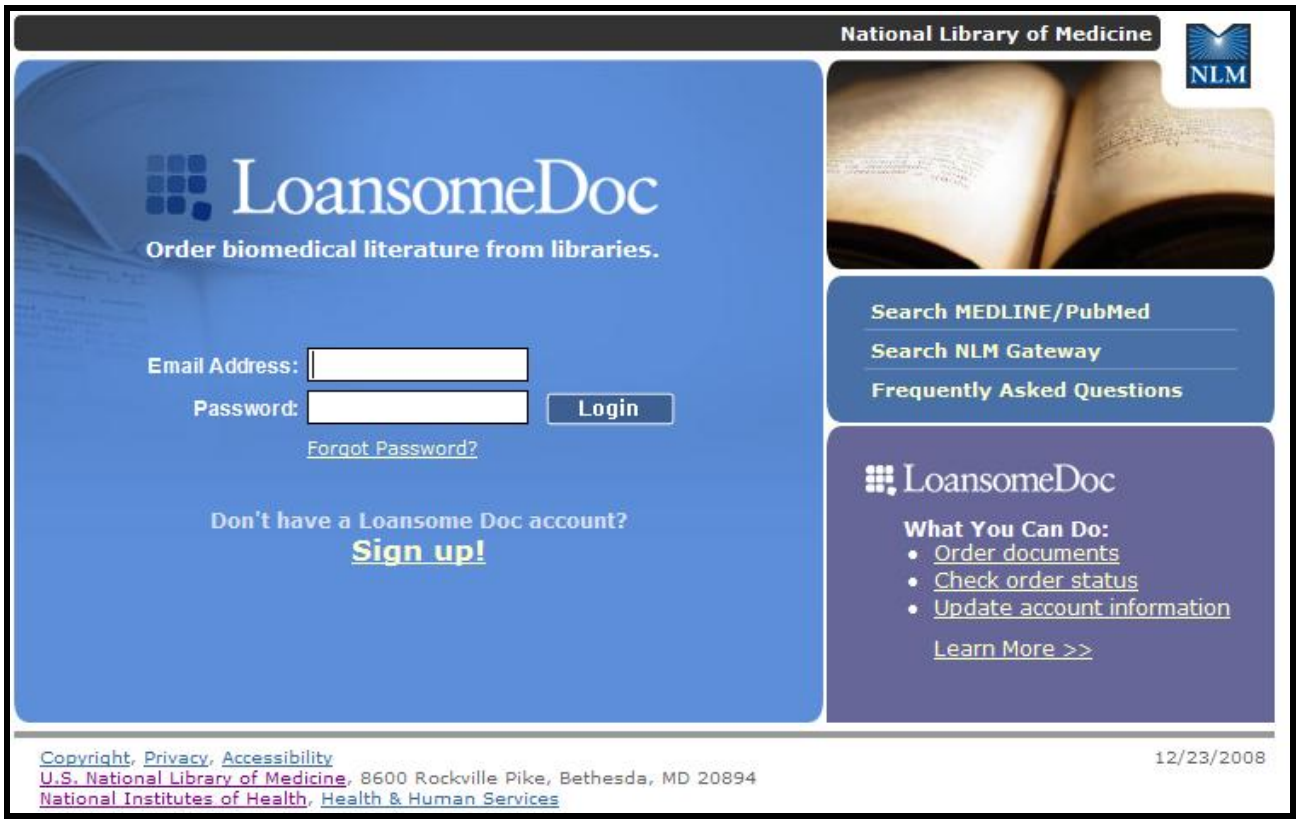
The library providing you this service will explain their ordering fees, if any. This service is generally **not** free.

What library can provide me with this kind of service?

Call your Regional Medical Library at **1-800-338-7657** Monday-Friday, 8:30 A.M. – 5:00 P.M. in all time zones to find out which medical library in your area can set you up with the Loansome Doc ordering service. Or visit **http://www.nlm.nih.gov/pubs/factsheets/loansome_doc.html** to find out more about Loansome Doc.

To order articles, select the citations for the articles by clicking on the check-box to the left of each item.

- Select **Order** from the **Send to** menu.
- You are brought to the page shown below:



On this page you can:

- log into Loansome Doc using your Email address
- obtain a status report of your orders
- update your Loansome Doc account information
- sign up for a Loansome Doc account
- link to FAQs
- learn more about Loansome Doc

For more information about obtaining full text articles, see the tri-fold handout, *Full Text and PubMed* at http://nnlm.gov/training/resources/fulltexttri.pdf.

N O T E S

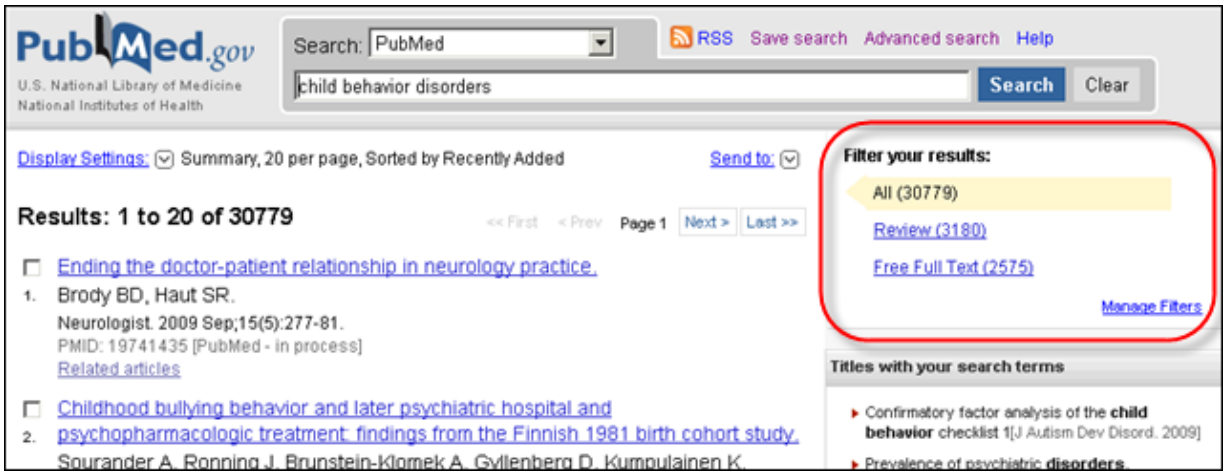
Additional Tools

Filters

- My NCBI includes a Filters feature which groups search results by areas of interest.
- Filters are available from the right hand column of your search results
- You can have up to **five** active filters using My NCBI.

Default Filters

- "All" shows the total retrieval for the search. "Review" shows the total retrieval for review articles. "Free full text" shows those citations that link without charge to the full text.

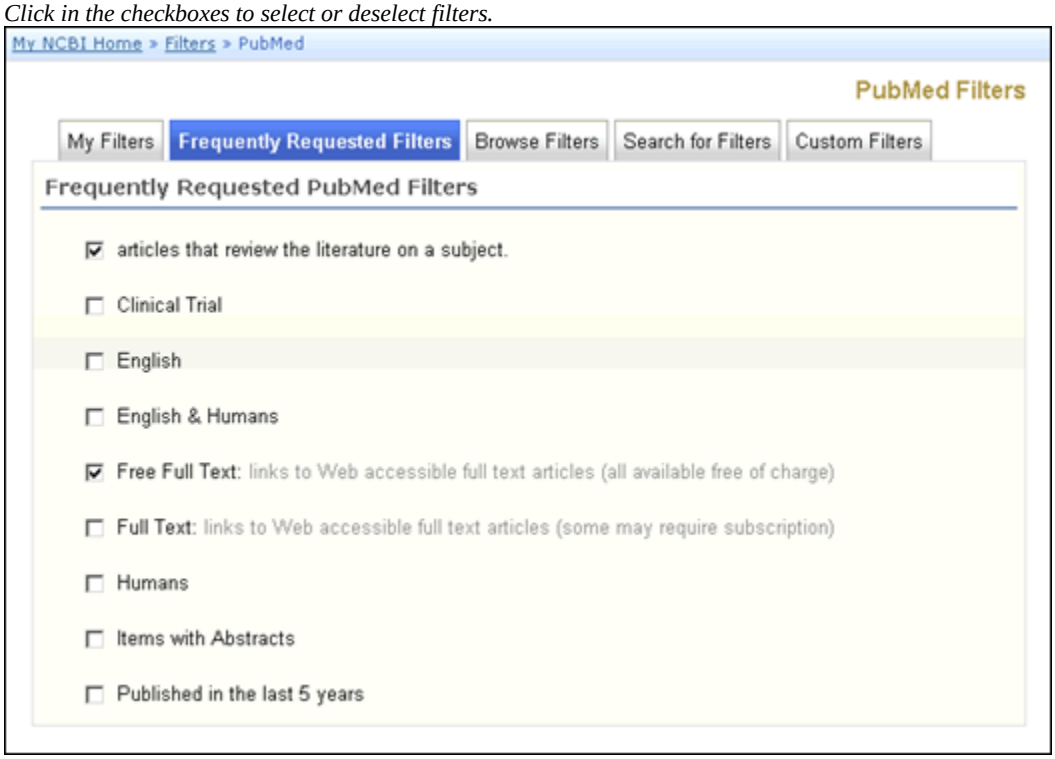


Adding Filters

- Use the **Manage Filters** link to the **My PubMed Filters menu** (you must sign in to My NCBI if not already signed in)
- This page displays the filters currently applied to PubMed, and provides links to the Frequently Requested Filters, and the Browse and Search options:

- Click on **Frequently Requested Filters** to add common filters to your display:

Click in the checkboxes to select or deselect filters.



Browse

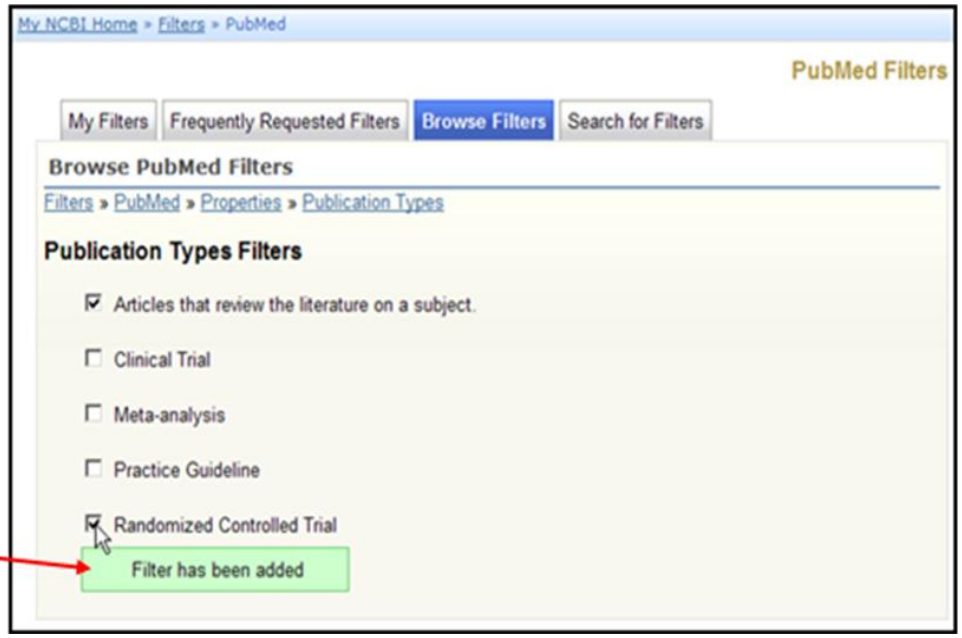
- Click on Browse to see additional options for PubMed filters.
- On the Browse page there are three categories:
  - LinkOut
  - Links
  - Properties
- Users interested in **subject-related filters** for their searches should look at **Properties**.

There are over 70 filter options under ***Properties.***

Under Properties, use the links to see the available filters for each sub-category. Here's the one for Publication Types:

Click in the checkbox to select the filter.

A confirmation message will display.



LinkOut Filters

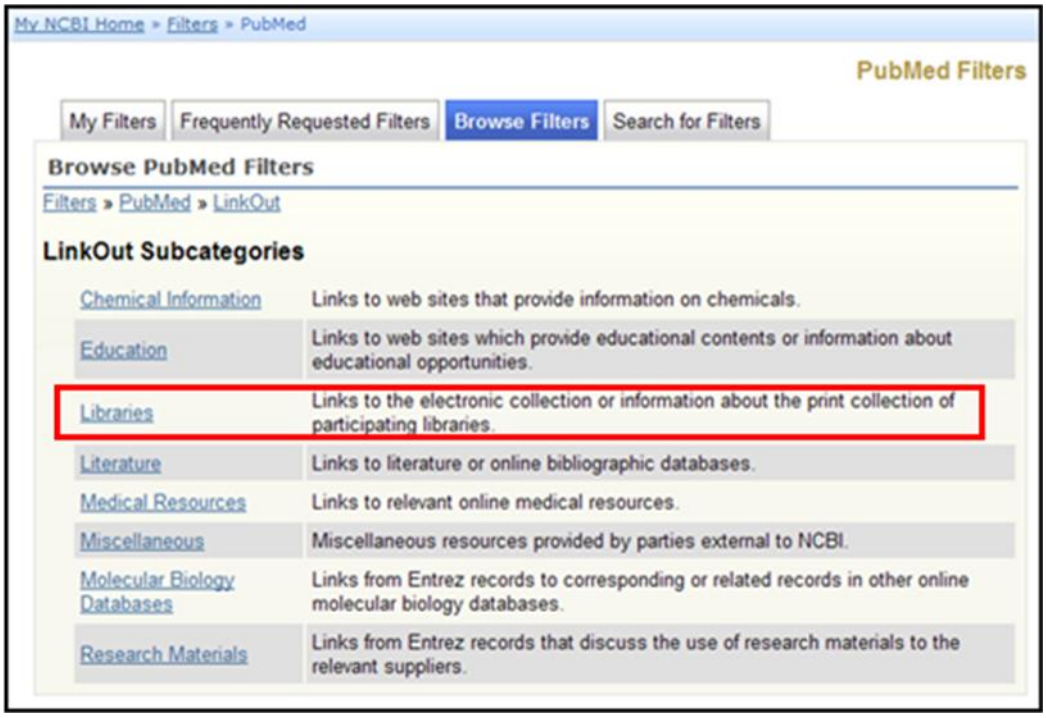
- Filters in this category group results by full text providers, libraries, and other outside resources.

Adding your library's holdings as a filter

- From the PubMed "Browse" filters page:

*Click on **LinkOut***

Click on ***Libraries***



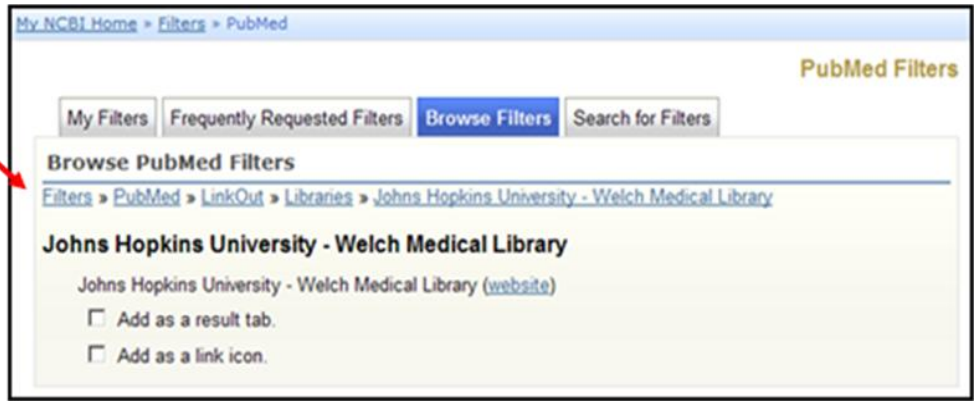
This will bring up a page with all of the LinkOut-participating libraries.

- Use your browser's Find feature to locate your library.
- Click on the desired library link.
- Then click on the checkboxes to add a result tab and/or display the library's icon:

Notice the use of "breadcumbs" on the Filters pages.

Each breadcrumb for a higher level is a link to that page.

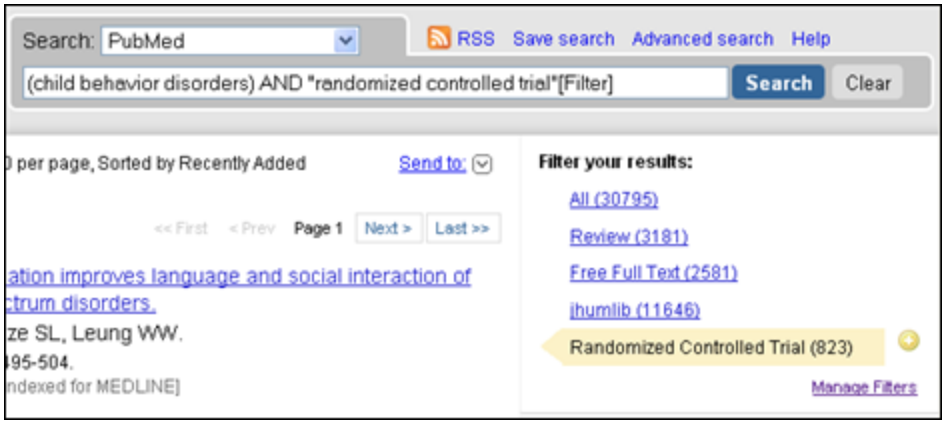
Click in the checkboxes to add these selections.



- Filter links for LinkOut providers display the LinkOut user name.
- Place your cursor over this ID to see the name of the provider.
- Users who connect to PubMed with a URL that includes a library's holdings parameter will continue to see their library icon even if they do not select their library in My NCBI. Users should select their library filter if they want to see a filter link for their library in the search results.

Using the Filter Links

- Click on a filter name to go to the citations for a particular filter. Select any display format you wish.
- When you click on the filter name to see the results for a filter, a (+) symbol will appear in the menu:

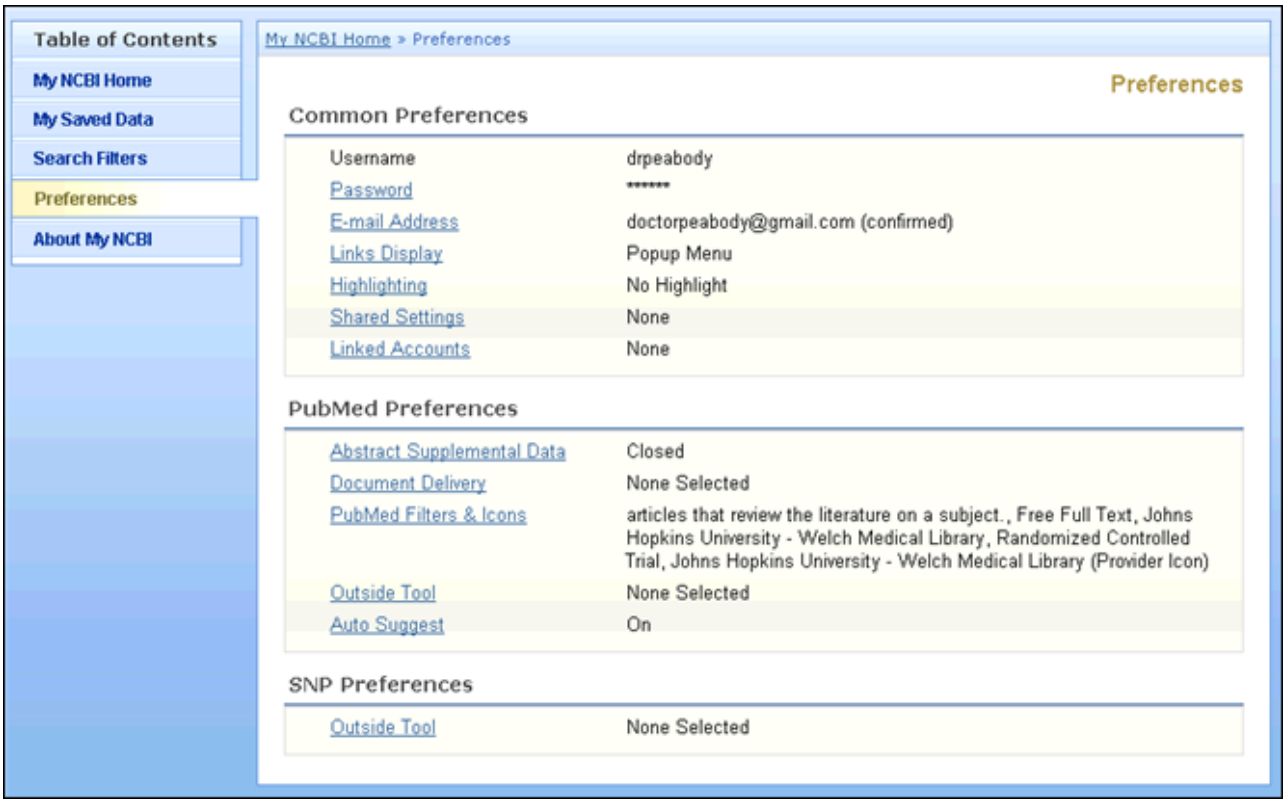


Clicking on the + icon adds that filter to the search box.

- Filters added using the (+) icon will display in the search box with the [Filter] tag.
- If you want to save this search, click on Save Search.
- Many filter topics can be added to the search via the Limits page. Either way will yield the same results.

My NCBI User Preferences

- Available from My NCBI sidebar.
- Save an e-mail address for Send to E-mail as well as automatic e-mail updates.
- Choose to expand the supplemental data in the Abstract display by default.
- Set your document delivery and/or Outside Tool preferences.
- Choose to highlight PubMed search words in retrieval when you are signed into My NCBI.



See demos on various My NCBI features. Click on PubMed Tutorials under More Resources from the PubMed homepage or go directly to:
http://www.nlm.nih.gov/bsd/disted/myncbi.html

Clinical Queries

- Available on PubMed homepage; also available from the bottom of the Advanced Search screen
- There are 3 search filters available from this page:
  Search by Clinical Study Category
  Find Systematic Reviews
  Medical Genetics Searches

Search by Clinical Study Category

- This specialized search query is intended for clinicians and has built-in search "filters" based on research done by R. Brian Haynes, M.D., Ph.D. at McMaster University in Canada.

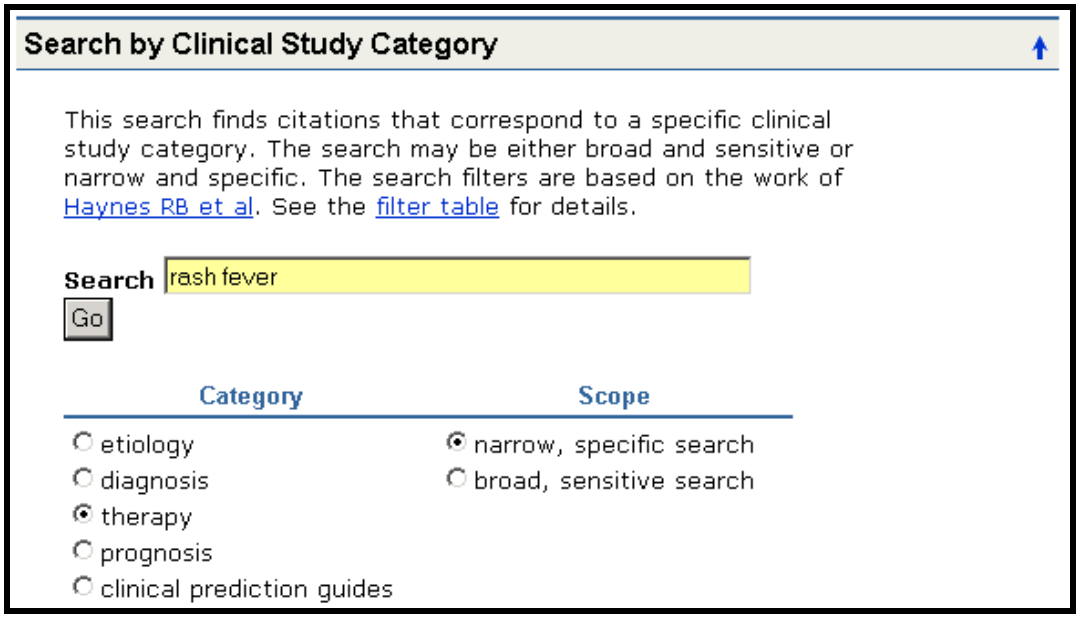
Five study categories or filters are provided:

- etiology
- diagnosis
- therapy
- prognosis
- clinical prediction guidelines

Two emphasis categories or filters are provided:

- narrow, specific search -- will get more precise, relevant citations but less retrieval
- broad, sensitive search -- includes relevant citations but probably some less relevant; will get more retrieval

Example: *Find citations on having a rash with a fever using the defaults of therapy and narrow, specific search.*

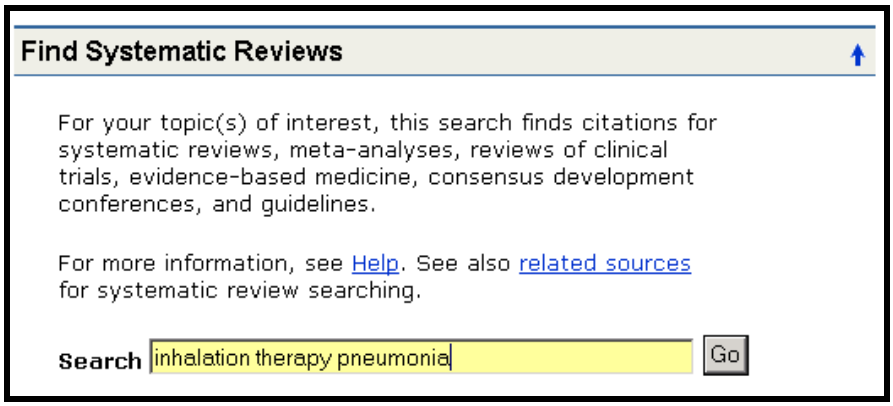


Find Systematic Reviews

- This feature is provided to help clinicians locate systematic reviews and similar articles.
- It retrieves systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, and guidelines. Citations from journals specializing in clinical review studies are also included.

Example: *Find Systematic Reviews on inhalation therapy for pneumonia.*

Enter search terms in the search box



This subset can be combined directly with other search terms using AND systematic [sb]. For example, lyme disease AND systematic [sb].

Alternatively, you may select Systematic Reviews from the Subset pull-down menu on the Advanced Search screen.

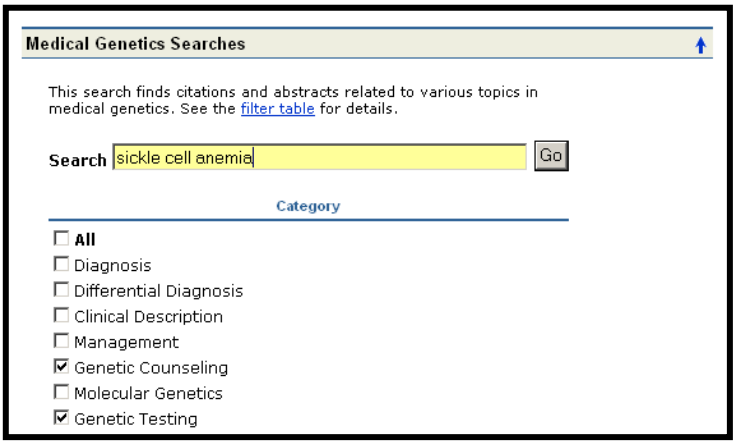
Medical Genetics Searches

- Finds citations related to various topics in medical genetics.
- Default is to **All** topics. Click on All check box to deselect; then click on topic(s) of interest.
- Developed in conjunction with the staff of GeneReviews: Genetic Disease Online Reviews at GeneTests, University of Washington, Seattle.

Example: *Find citations about sickle cell anemia using the Medical Genetics Searches categories: Genetic Counseling; Genetic Testing*

Enter search terms in the search box.

Select topics of interest.



Special Queries – Health Services Research (HSR) Queries

Why?

- Provides a search interface to find PubMed citations relating to **health care quality** and health care costs

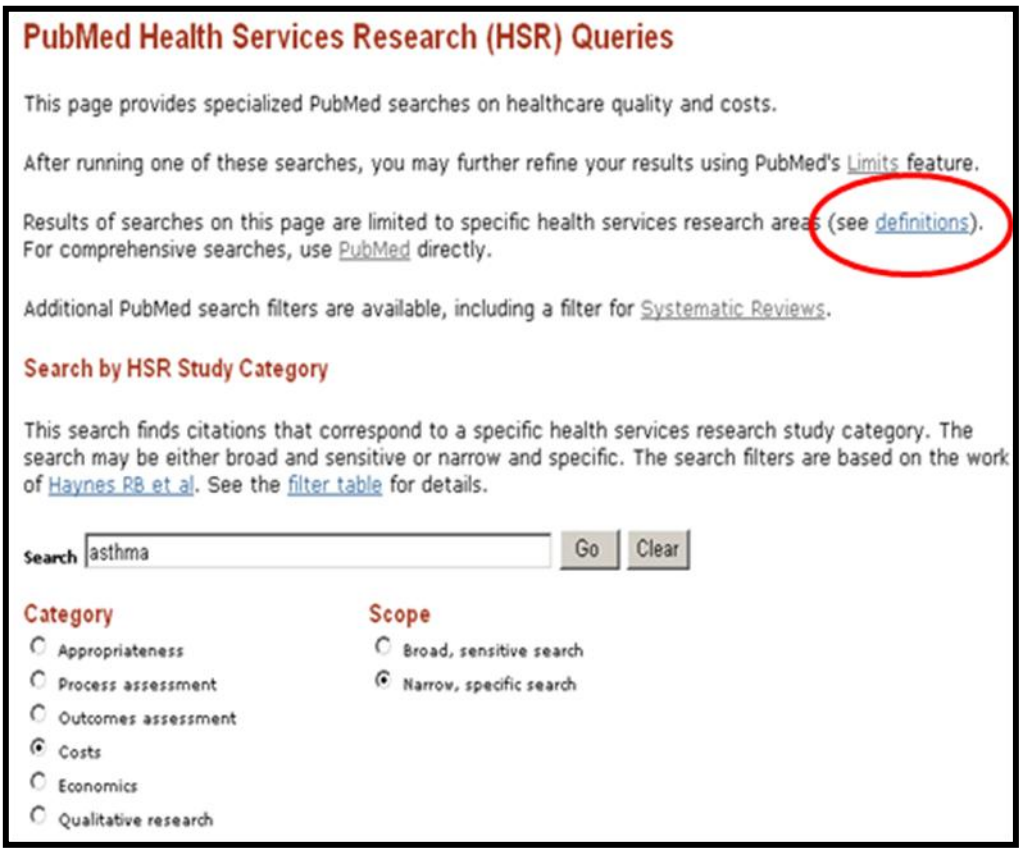
Where?

- Click on **Topic-Specific Queries** from PubMed homepage; or click on the link from bottom of the Advanced Search screen
- Click on **Health Services Research (HSR) Queries** from the Special Queries page

*Click on "**definitions**" to display helpful explanations of the HSR categories.*

Enter search terms here.

Choose appropriate category and scope.



Linking to PubMed

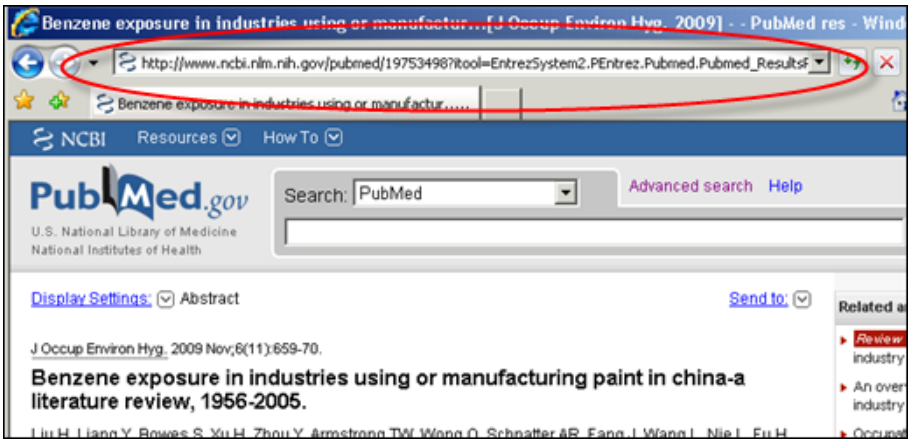
Creating Links to PubMed Citations and Searches

To create a link to PubMed citations for use in a bookmark, Web page, or e-mail message, create or generate a customized URL. With this URL, you can link to specific citations or link to the current results of your PubMed search strategy.

Recent publications from the Washington University School of Medicine faculty (Bernard Becker Medical Library). The PMID number links to the citation in PubMed in Abstract format.

To create a link to a single citation in PubMed:

1. View the citation in the Summary format
2. Click the title link to display the Abstract format
3. Bookmark this page, or copy the URL from the browser's address bar to paste as a link in a Web page or e-mail message



Copy the URL from the address bar when viewing a single citation in the Abstract display.

To create a customized link to one or more citations in your preferred format:

Use the base URL for PubMed:

http://www.ncbi.nlm.nih.gov/pubmed/

then add the PMID.
For multiple PMIDs, use commas (but no spaces) between each number, as follows:

18235850,17701905

Add **?&report=** followed by your preferred display format (docsum, brief, abstract, medline, xml,– see PubMed Help at http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.table.pubmedhelp.T40 for descriptions), as follows:

?&report=abstract

Strung together, your URL now looks like:

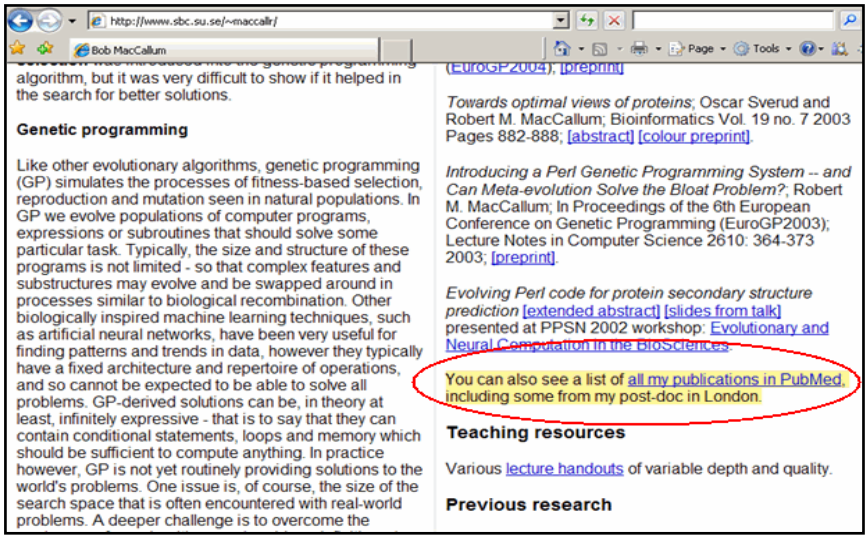
http://www.ncbi.nlm.nih.gov/pubmed/18235850,17701905?&report=abstract

Note that there are no spaces.

To create a link to the results for a short PubMed search (e.g., an author's name):

1. Run the search
2. Click on the Advanced Search link
3. Go to Details
4. Click on the URL button, below the search details
5. Bookmark this page, or copy the URL from the browser's address bar

A personal home page with a link that runs a search for the author's citations in PubMed.



Click on the URL button on the Details page to create a link to a PubMed search.

Note: Some browsers have a size limit for URLs in the address bar. If your link doesn't work, the search string may be too long for your browser. Use the "customized link" method, described below.

To create a customized link to PubMed search results:

A customized search link allows you to select the display format and number of citations in the PubMed results page.

Use the base URL for a PubMed "search" function:

http://www.ncbi.nlm.nih.gov/pubmed?term=

Add your search terms. Use the "+" sign between terms instead of spaces, as follows:

gastrointestinal+stromal+tumors

To use specific search fields, use the field tag (see Search Field Descriptions and Tags http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.section.pubmedhelp.Search_Field_Descrip). For example, to limit the above search to articles published in the last ten years, use the [dp] tag, as follows:

+AND+"last+10+years"[dp]

Optionally, add **&report=** followed by your preferred display format (docsum, brief, abstract, medline, xml), as follows:

&report=abstract

Add **&dispmax=** followed by the number of items to display on each page, as follows:

&dispmax=100

Your finished URL will look like:

http://www.ncbi.nlm.nih.gov/pubmed?term=gastrointestinal+stromal+tumors+AND+"last+10+years"[dp]&report=abstract&dispmax=100

Note that there are "&" symbols between each element, and there are no spaces.

Troubleshooting:
If your URL isn't working, the special characters may not be interpreted properly by PubMed. Try the following substitutions:

- Use **&** instead of **&**
- Use **%20** instead of **+**
- Use **%5B** instead of **[**
- Use **%5D** instead of **]**
- Use **%22** instead of **"**

For more details on creating links to PubMed or other Entrez databases, see Creating a Web Link to the Entrez Databases at http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helplinks.chapter.linkshelp

E-Utilities

- E-Utilities provide access to Entrez data outside of the regular web query interface.

Why use E-Utilities?

- E-Utilities are useful for retrieving large sets of PMIDs or records, or counts of records, matching a search strategy.

There are specific instructions and requirements for using E-Utilities in order to manage the workload on NCBI servers. See the E-Utilities documentation on the PubMed home page. You may consider asking your institution's IT staff for technical support.

Review Exercises

Choose one or two of the below case studies to review what you've learned about PubMed. Use My NCBI Save Search and Collections features to save your work.

1. Emergency department physicians are concerned about the number of patients who leave the department without being seen (usually because they feel they have waited too long). Find articles about this phenomena using PubMed.

2. Locate information on the Pelizaeus-Merzbacher Disease. Please search back to 1988. Do the Clinical Queries help you find information on etiology?

3. What are the economic effects of breast cancer on a community? Consider using MeSH subheadings and/or the Health Services Research (HSR) Queries (follow the link to Topic-Specific Queries on the PubMed homepage or Advanced Search page).

4. Find the latest review articles on Edwards Syndrome.

5. A woman presents with dementia and the neuropathological findings suggest a prominent contribution by Cerebrovascular disease. Find information on diagnosis and treatment. Try the Clinical Queries, Search by Clinical Study Category.

6. Explore the ethical issues raised by the deaf community regarding cochlear implants. Consider using a subset, or looking specifically at audiology journals (see the broad subject term in the Journals Database).

7. Find systematic reviews for accidents caused by sleep deprivation.

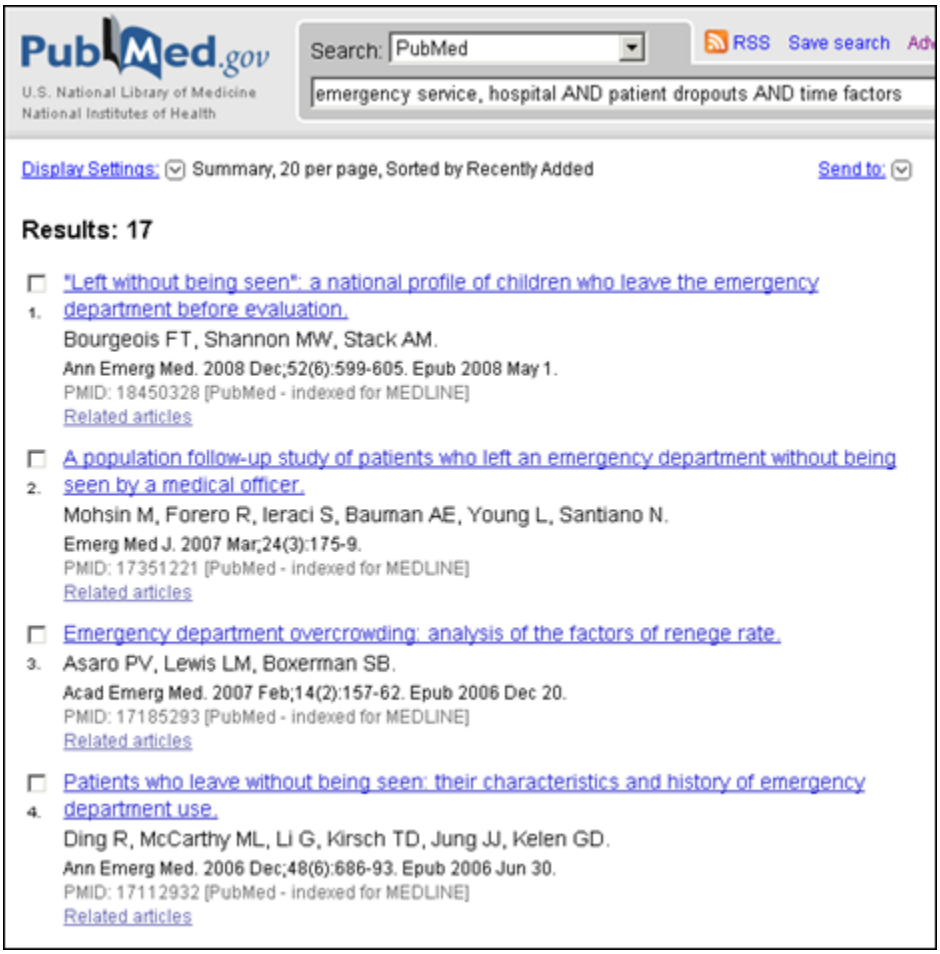
Finished? Sign up for NLM Announces at https://list.nih.gov/archives/nlm-announces.html to receive a weekly e-mail with important news about PubMed and other NLM services.

Review Exercises: Suggested Answers

1. Emergency department physicians are concerned about the number of patients who leave the department without being seen (usually because they feel they have waited too long). Find articles about this phenomena using PubMed.

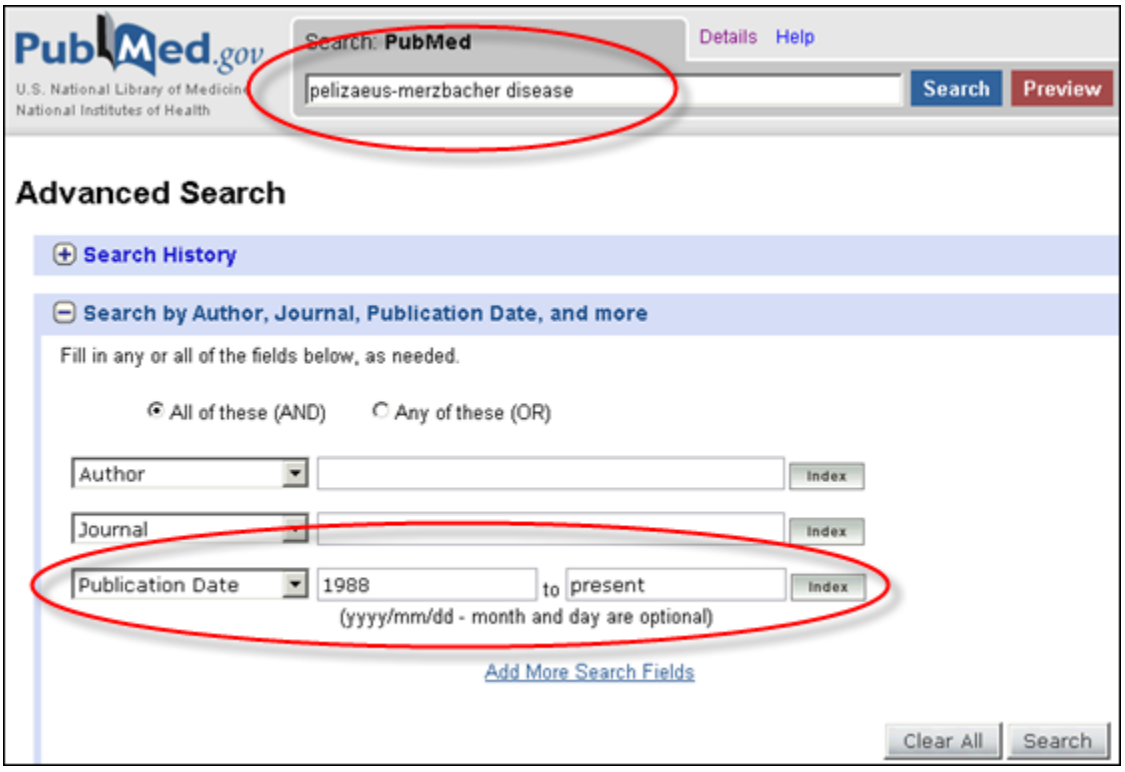
One approach:

emergency service, hospital AND patient dropouts AND time factors

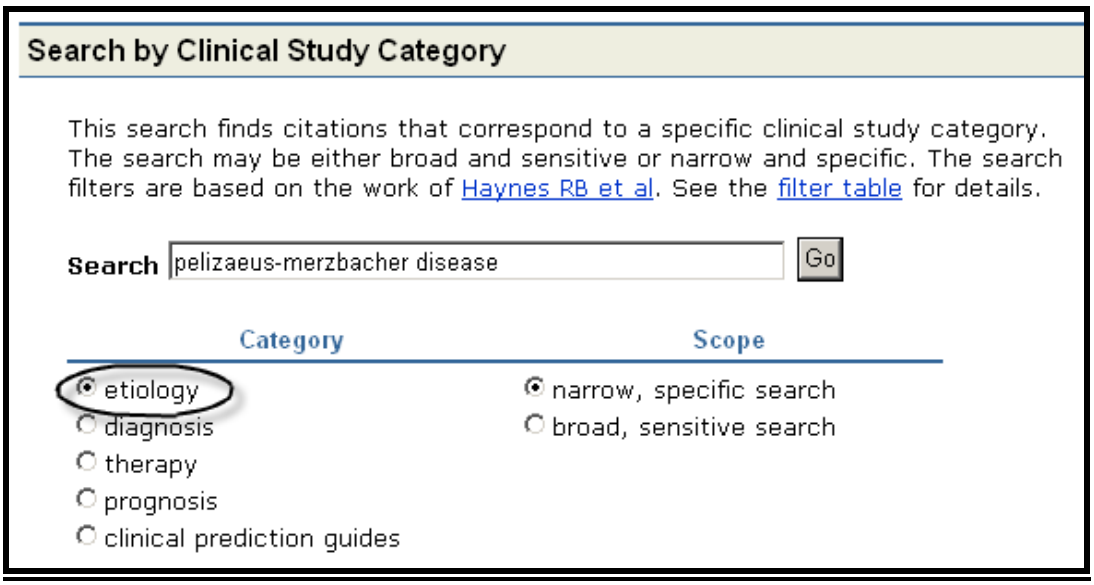


Use natural language to begin your search and then review MeSH headings used to index relevant articles to determine patterns of indexing for pertinent articles.

2. Locate information on the Pelizaeus-Merzbacher Disease. Please search back to 1988. Do the Clinical Queries help you find information on etiology?

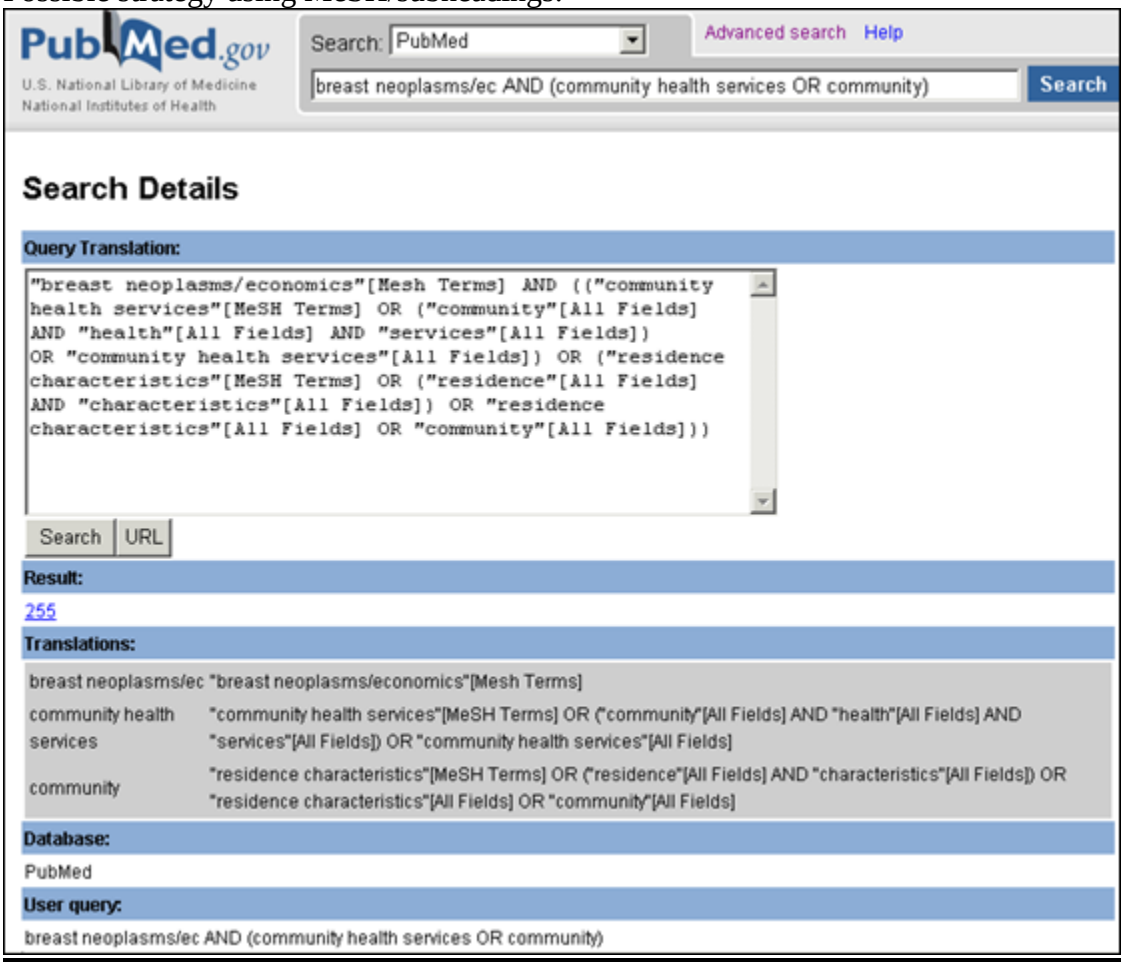


Using Clinical Queries (Search by Clinical Study Category) to locate etiology information:



3. What are the economic effects of breast cancer on a community? Consider using MeSH subheadings and/or the Health Services Research (HSR) Queries (follow the link to Topic-Specific Queries on the PubMed homepage).

Possible strategy using MeSH/subheadings:



Using Health Services Research Queries from the Special Queries page:

4. Find review articles on Edwards Syndrome.

- Search: "edwards syndrome" as a phrase so PubMed's automatic term mapping does not break it apart.
- Then review the citations and the MeSH headings used to index the citations to figure out what Edward Syndrome is. From that review, you should ascertain that Edwards Syndrome is a Trisomy, specifically Trisomy 18.
- If you check the MeSH Database, you will find that Trisomy 18 is not a MeSH heading.
- When you continue to review relevant citations, you will find the indexing pattern using the two MeSH Headings of Trisomy and Chromosomes, Human, Pair 18 for Edwards Syndrome.
- Therefore, a recommended search strategy could be:

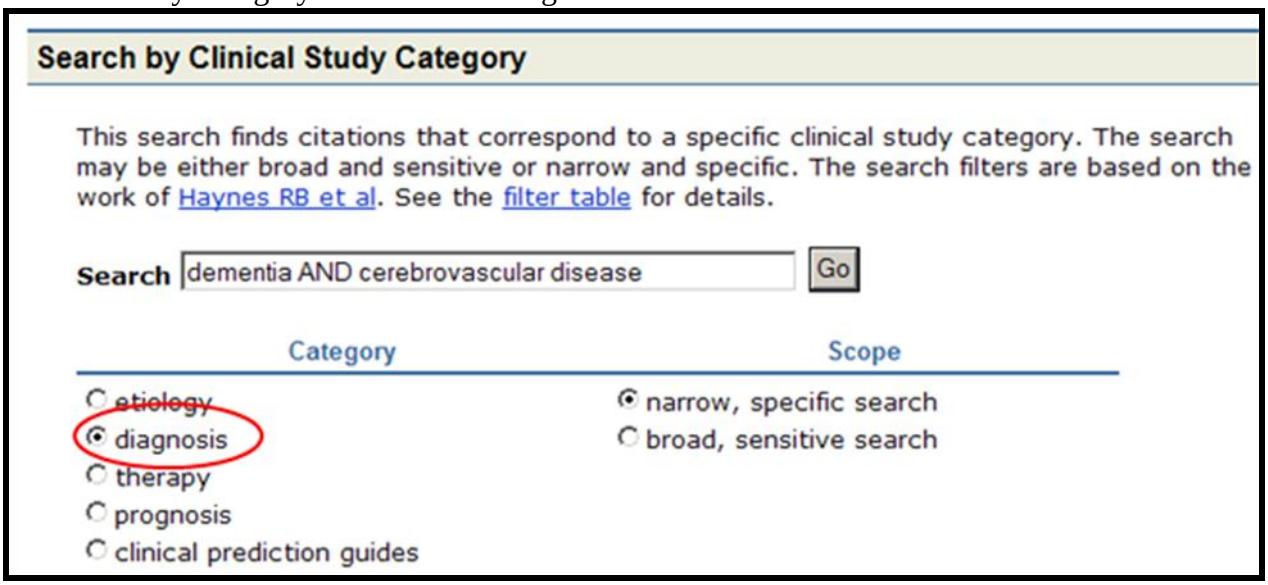
(trisomy [mh] AND chromosomes, Human, Pair 18 [mh])

- Click on the Review filter to view the Review articles subset of this retrieval.

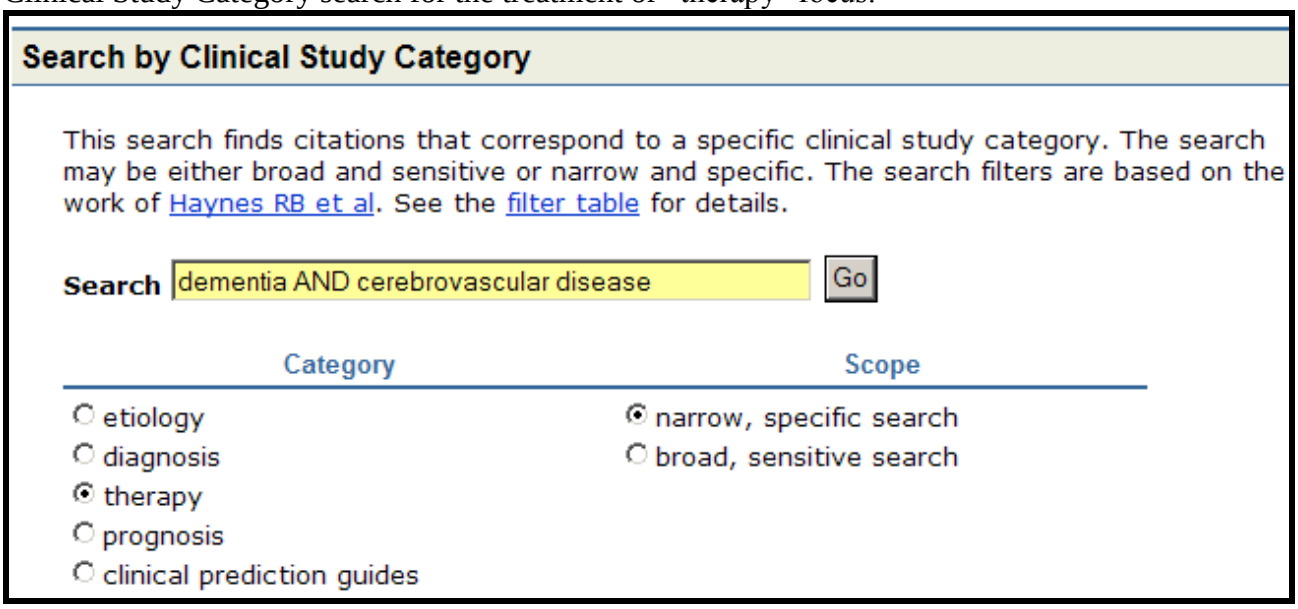
5. A woman presents with dementia and the neuropathological findings suggest a prominent contribution by Cerebrovascular disease. Find information on diagnosis and treatment. Try the Clinical Queries, Search by Clinical Study Category.

Because you can only select one Clinical Study Category at a time, you must run 2 separate searches from the Clinical Queries page and then using the Advanced Search screen History feature combine those searches together for your final result. (Hint: There is a link to Clinical Queries at the bottom of the Advanced Search screen.)

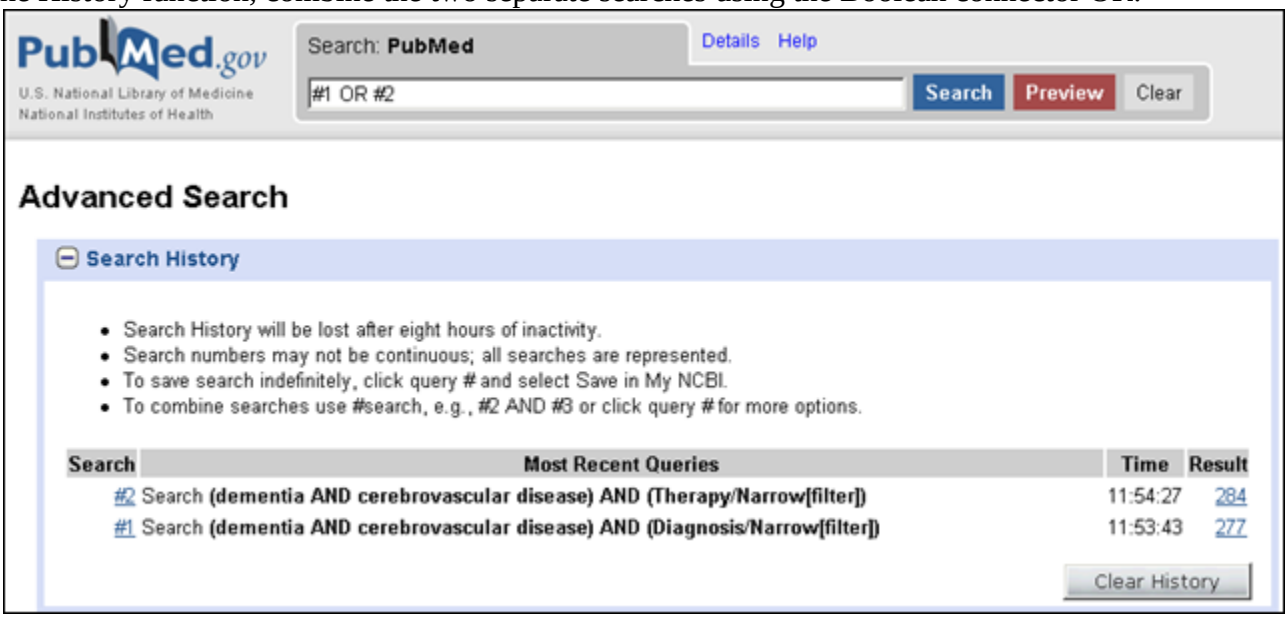
Clinical Study Category search for the diagnosis focus:



Clinical Study Category search for the treatment or "therapy" focus:

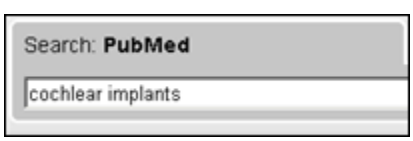


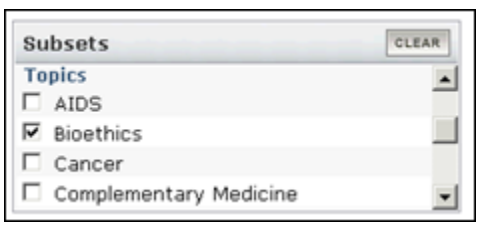
Using the History function, combine the two separate searches using the Boolean connector OR:



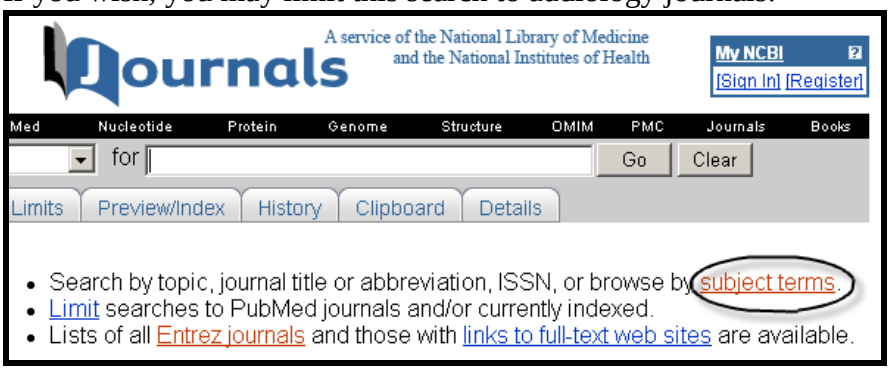
6. Explore the ethical issues raised by the deaf community regarding cochlear implants. Consider using a subset, or looking specifically at audiology journals (use the broad subject term in the Journals Database).

Using the Bioethics Subset Limit via the Advanced Search screen:

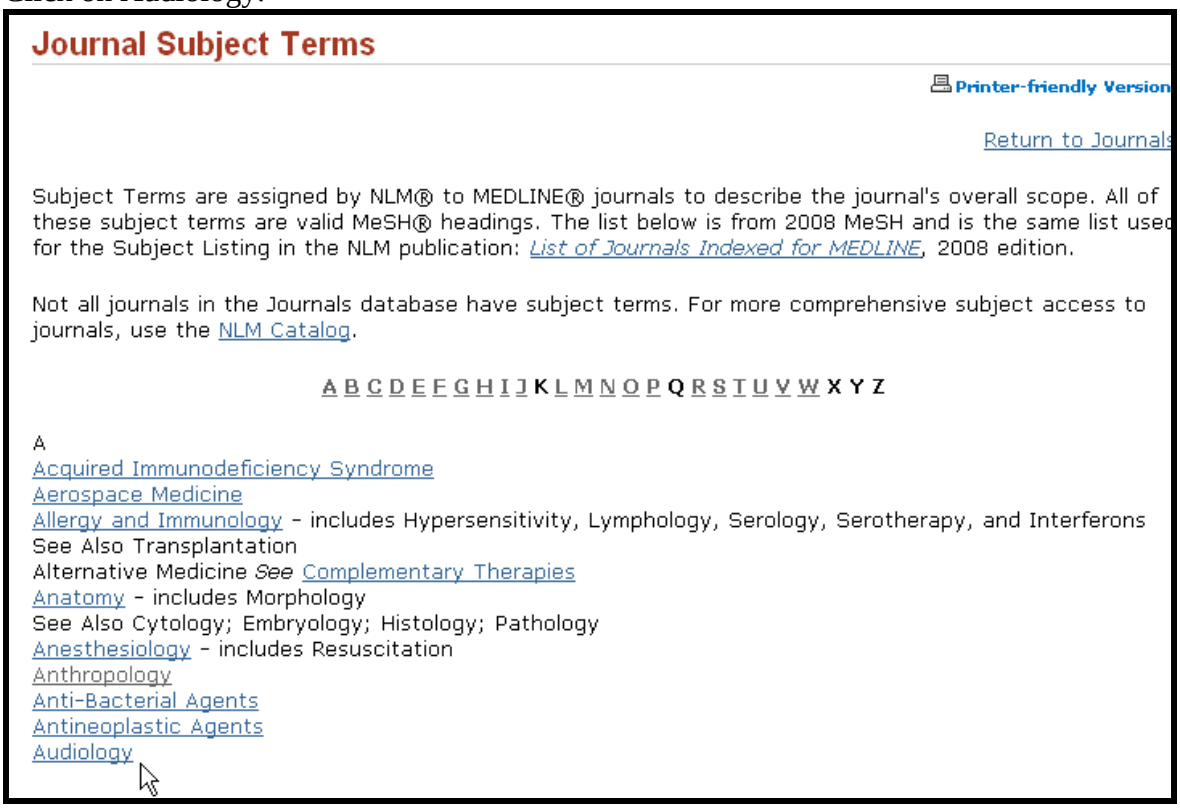




If you wish, you may limit this search to audiology journals:

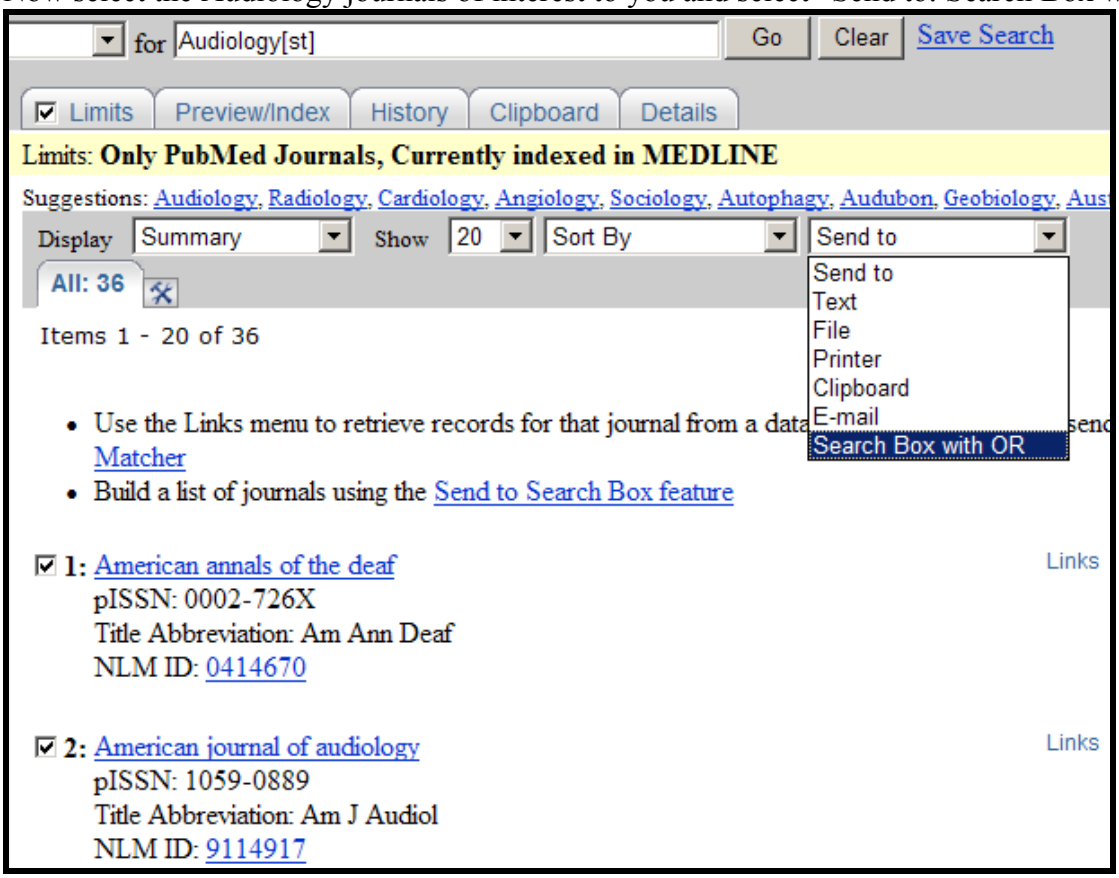


Click on Audiology:

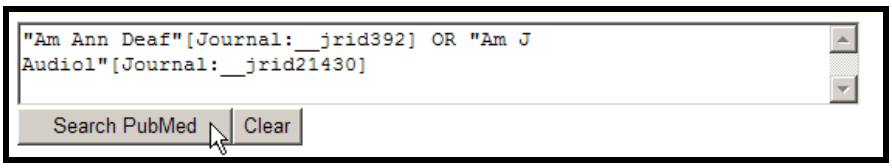


Go to Limits and select currently indexed PubMed journals:

Now select the Audiology journals of interest to you and select "Send to: Search Box with OR."

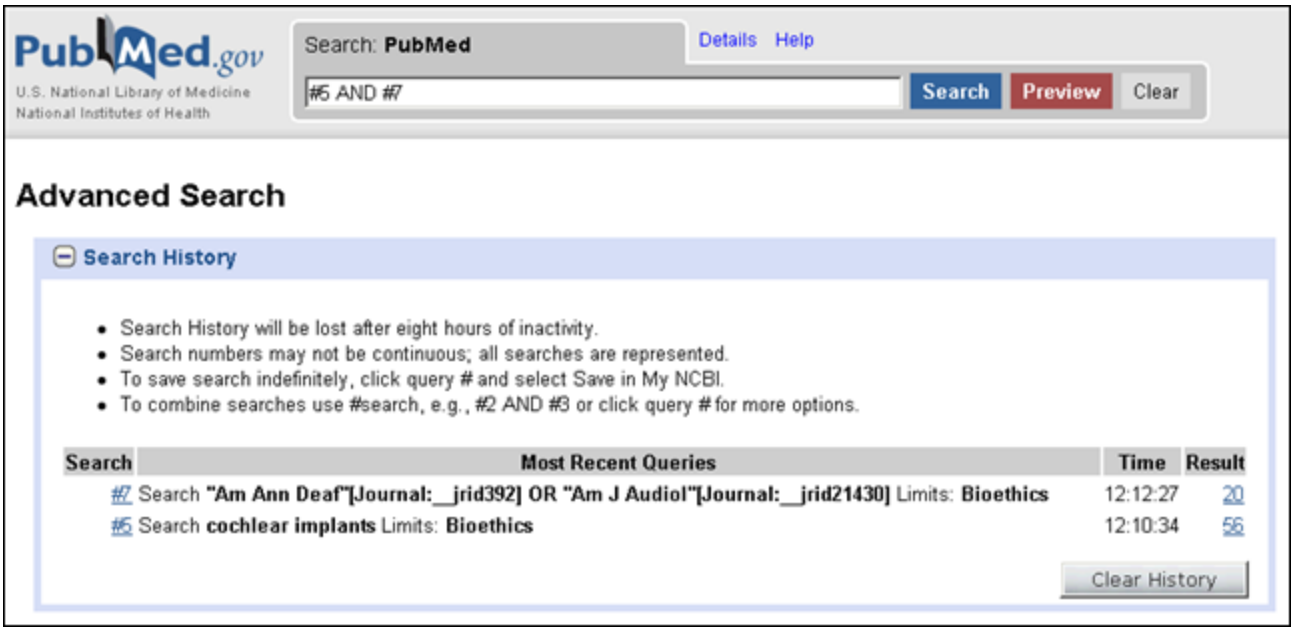


Then click the Search PubMed button under the larger search box.



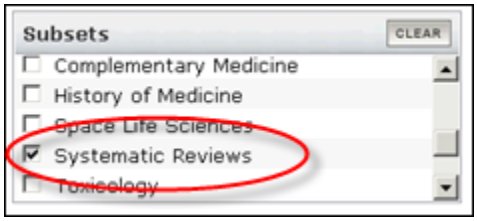
Alternatively, select **PubMed Links** from the Display pull-down – this option selects ***all*** the journal titles displayed and searches them in PubMed.

Now go to History and combine the two searches:



7. Find systematic reviews for accidents caused by sleep deprivation.

   Using Advanced Search:



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